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ABSTRACT

Eight modules are presented for instruction of teachers of intellectually gifted students. Modules include statements of objectives and subobjectives, as well as assignments of activities to demonstrate mastery of the basic materials. Modules address the following topics (sample subtopics in parentheses): population (rationale for units, characteristics of gifted students); cognitive behavior (B. Bloom's taxonomy); deductive sequencing (R. Gagne's eight levels of learning); learning activities (suggestions based on Bloom's taxonomy); terminal and enabling objectives; inductive sequencing of learning activities (problem solving); management systems (learning activity packets, learning centers, grouping, theme development, independent study, and contracts); and communication (conflict resolution, problem ownership). Worksheets are appended. (CL)

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gifted education system module

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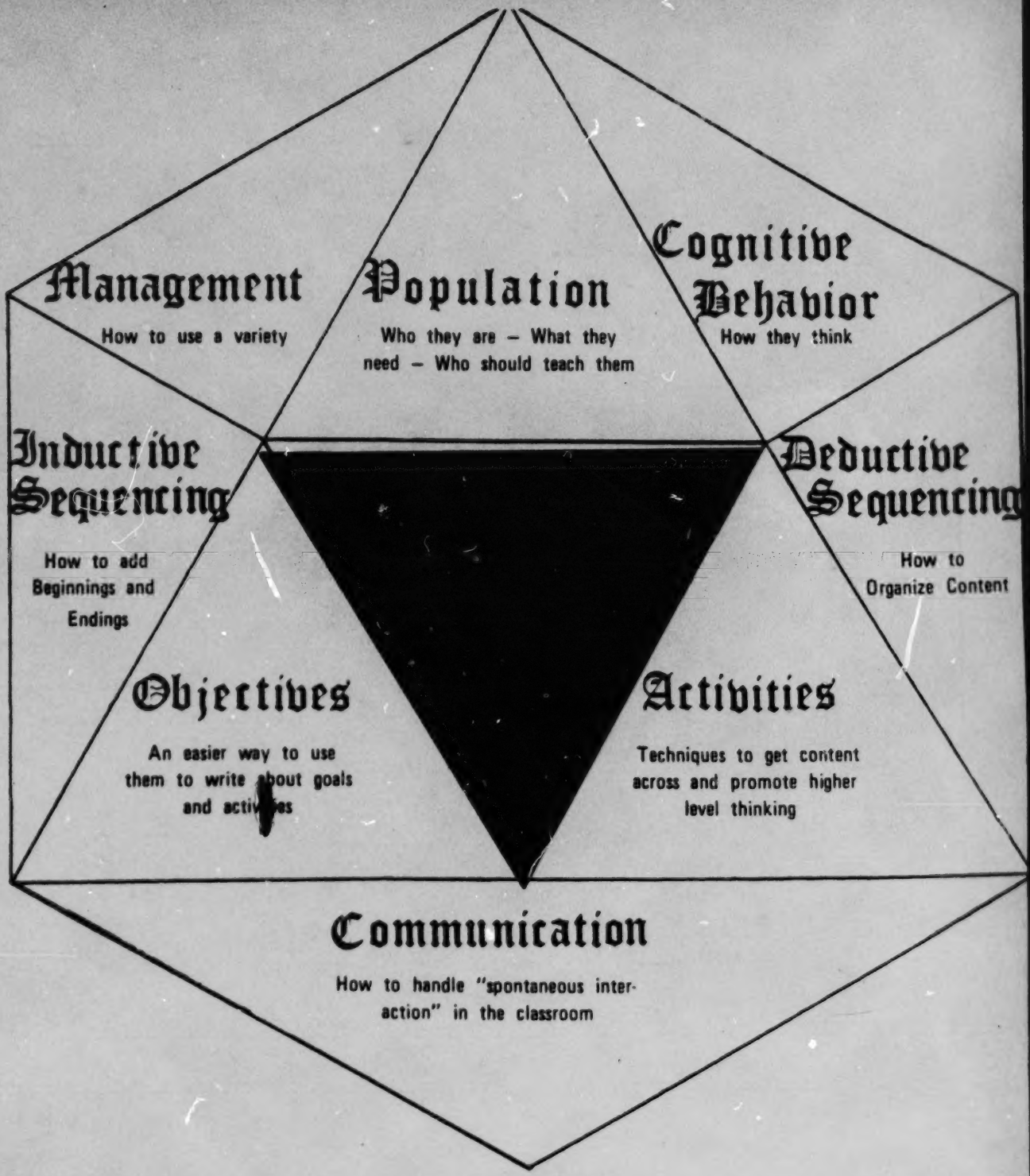
Gifted Education Module System

Only the teacher can combine the variables of time, space, student, and subject matter to provide a successful learning environment.

Monroe 2 Orleans
BOCES


Management
How to use a variety
Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
Deductive Sequencing
How to Organize Content
Objectives
An easier way to use them to write about goals and activities
Activities
Techniques to get content across and promote higher level thinking
Communication
How to handle "spontaneous interaction" in the classroom

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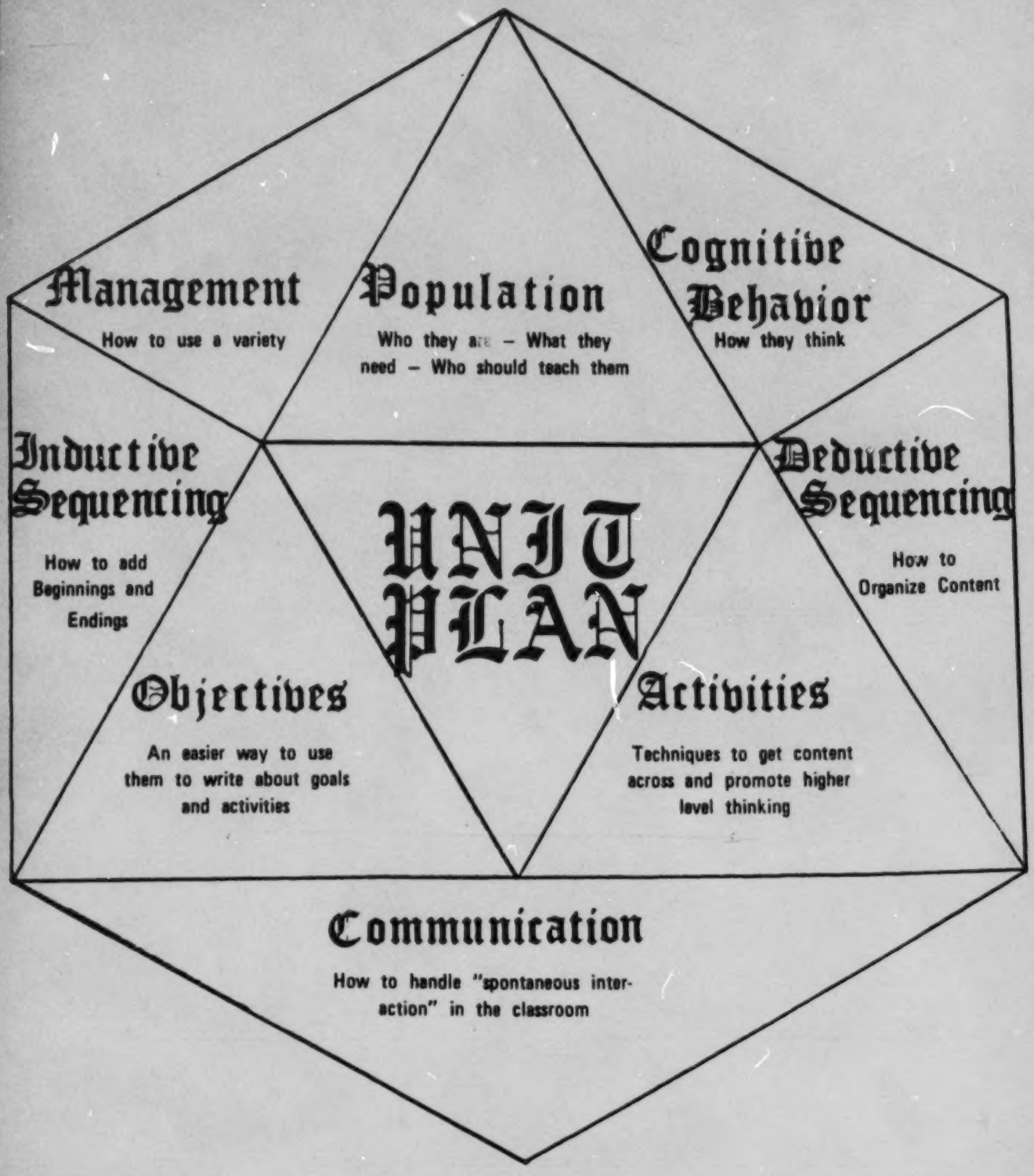
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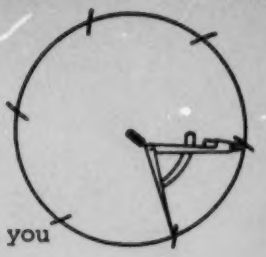


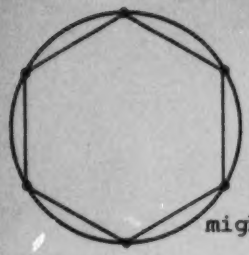
Creating Design Excellence

The unique setting which is the classroom is an expression of who you and your students are. Its organization reflects how you bring all your experience and training to bear in an effort to create a learning environment. This setting includes all the gems of your experience in education. The GEMS book is composed of modules on topics which are the "gems" of gifted education. They are the basics for a differentiated education.

Have you ever bought, borrowed, or stolen a program, or even a single unit that you used in its original form? Has it not always been necessary to adapt it to your particular needs? We have found that just as students have individual needs, teachers do also. Recognizing that this is true of most educators, we are presenting you with information on the components of a program for gifted students and suggesting that you adapt it to form the unique setting that is your classroom. Like a master jeweler, you must cut and mount these gems to show off their brilliance in your own unique setting.

The first step in this process of achieving design excellence is mastery of the basic material. Each module presents information to be mastered and an activity to demonstrate that mastery. Only as the pieces are completed can they fall into place. The information is best digested over a period of several weeks. When the components are familiar, the design of the unit plan can follow. This final product is completed, however, only with a large measure of your creativity.

The theme of a unit is the perspective you, the teacher, select to take. Almost any perspective is acceptable as long as it can include the basic information (curriculum), and it is a topic you are interested in. Since the emphasis in gifted education is on the process, a model or tool which



might be generalizable is most appropriate for the theme. "The election of a president" for example, would be more appropriate than "The election of Calvin Coolidge". Other examples follow:

Content	Theme
Electricity	Efficient usage of electricity
Mythology	How man explains the unknown
Evolution	Causes of change
Western Europe	How cultures influence each other
Middle Ages	Recreating history - Historical Fiction

Some classes have the opportunity to use interdisciplinary themes. Almost anything will do - butterflies, green, popcorn. Often the more fanciful the topic, the more interesting its application to the various disciplines. In addition, the interdisciplinary effect allows students the breadth they need to create unique products.

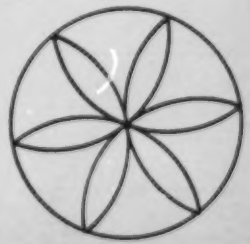
The distinguishing characteristic of gifted education is that information is no longer being gathered for application. Instead, information is being mastered for the purpose of production. The chief characteristic of the gifted - the ability to think at higher cognitive levels - necessitates a program aimed at finding a productive outlet.

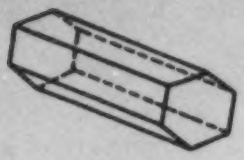
As a result of completing this program you will produce one unit and have gained the skills to complete many others. The development of your unit will follow a sequence of your own choosing. The one below is suggested. If you find you are having difficulty with a particular "gem" please move to another one. The list below provides a description of the tasks to be completed to demonstrate mastery of each module. Worksheets are provided on

page 145-148. A completed worksheet appears on pages 149-152. After all your gems are mounted, and polished, please use the form on p. 153 for a final copy.

Module	Your Task	Date Completed
Module 1 Population	Select a unit topic. Write a rationale for unit.	
Module 2 Cognitive Behavior	List cognitive behaviors and verbs which indicate those that are suitable for inclusion in your unit of study.	
Module 3 Deductive Sequencing	Identify concepts in your unit of study and then identify prerequisite multiple discriminations. List principles and problems that may be examined within this content area.	
Module 4 Learning Activities	Write eighteen learning activities that will involve students in using and achieving desired cognitive behaviors.	
Module 5 Terminal and enabling objectives	Arrange all activities within a framework of terminal and enabling objectives.	
Module 6 Inductive Process	Write introductory and culminating activities to facilitate an inductive learning approach.	
Module 7 Management Systems	Convert learning activities into a format for actual use with students in one of six alternative management systems in either a deductive or an inductive sequence.	
Module 8 Social Communication	Add communication skills principles to your unit.	

You now have completed the work for a Unit of Work for Gifted Students. Now condense, rewrite, and put it in the final form given on p. 153.





Module 1

Population

T The teacher will be able to write a rationale for a unit of study to be used with intellectually gifted students in a qualitatively differentiated program as demonstrated by criteria included in this Module. (Synthesis)

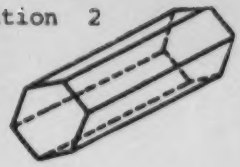
E_1 The teacher will describe characteristics of intellectually gifted students as a result of reading descriptions. (Comprehension)

E_2 The teacher will list characteristics of a qualitatively differentiated unit of study for intellectually gifted students as a result of reading a description and studying examples. (Comprehension)

Population
(Unit of Study)

Characteristics of Intellectually Gifted

Qualitatively Differentiated Unit of Study



T The teacher will be able to write a rationale for a unit of study to be used with intellectually gifted students in a qualitatively differentiated program as demonstrated by criteria included in this Module. (Synthesis)

Rationale

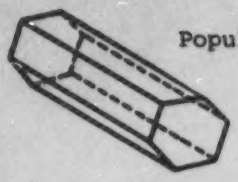
Intellectually gifted students are defined as individuals with I.Q.'s two standard deviations above the mean on an individually administered I.Q. test, that is, 130+ on the Stanford Binet or 132+ on the WISC-R. Because of unique qualities possessed by these individuals their needs are often not met in traditional classroom settings. An examination of these students reveals certain commonalities that can be enhanced through qualitatively differentiated programing that is distinctly different from traditional classroom programing.

Our study of the qualitatively differentiated programs begins with the characteristics of the population we will be dealing with and implications for topics of study to use with this population.

E_1 The teacher will recognize characteristics of intellectually gifted students as a result of reading descriptions. (Knowledge)

Intellectually gifted students, first, gain more input from their environment and second, store more information for longer periods of time. These two characteristics have obvious curricular implications. These abilities permit gifted students to accumulate greater quantities of information in shorter time periods and provide for more rapid recall of factual information than their agemates. Attention to these two characteristics generally leads to increased content in a reduced time period. Acceleration, grade skipping and some forms of enrichment are manifestations of concern with these two gifted characteristics. More content in less time leads to a quantitatively differentiated program for gifted students.

The third characteristic of gifted students is by far the most important and provides the key for building qualitatively differentiated programs. Gifted students have the ability to process information, i.e. evaluate, synthesize and analyze information far more efficiently than their agemates. An appropriately differentiated program for the gifted must therefore include greater quantities of information and a heavy emphasis on nurturing processing skills. It is estimated that currently, 92% of questions asked in elementary classrooms are low level cognitive questions and that 90 - 95% of all curricular materials focus on low level cognitive behaviors. On the other hand, academically gifted students need anywhere from 20 - 50% of their time dealing with higher cognitive processes.



Population 3

Although intellectually gifted students are defined as students with an I.Q. (individually administered test) of two Standard Deviations above the mean, the expense of this type of testing often negates using it with an entire population. Some means of identifying potentially gifted students is generally applied to the entire population and is followed by further screening until the desired gifted population is identified.

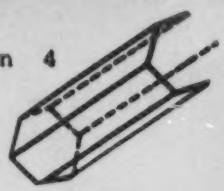
Although there are frequent cautions that group administered achievement and I.Q. tests will miss up to 50% of truly gifted and talented students, this caution applied to the notion of giftedness prior to the designation of the six categories of giftedness now generally in use. It is true that creativity, leadership, and visual and performing artists were not adequately identified by standardized tests. When dealing with the one category of intellectually gifted however, the percentage of students missed by group administered standardized tests will be substantially lower. There does remain however, the possibility that group administered, paper and pencil tests will miss some intellectually gifted students, that is, students who would normally score 130+ on the WISC and 132+ on the Stanford Binet. Miss-identified students may also include another group, the so-called "over-achievers", individuals who are not gifted but score very well on standardized paper and pencil tests.

Truly gifted students may fail to demonstrate their ability on group administered tests for one of three reasons:

1. They may have a greater store of information than the population on which the test was normed and can often justify more than the one correct answer. They may become quite frustrated with multiple choice formats frequently found on group tests.

2. Intellectually gifted students are often more interested in processes and causes than with "fill in the blank" type questions and see little significance in low level cognitive questions so they treat these tests with indifference.

3. Intellectually gifted students may be bored with traditional knowledge-oriented courses of study and may fail to accumulate the standard set of knowledge sampled on popular group administered tests.



Because of the limitations of group testing, multiple measures, including parent nomination, teacher nomination, school achievement and anecdotal records often contribute to the pool of potentially gifted with final decisions made through committee structures. Parent nomination forms generally look for behaviors like:

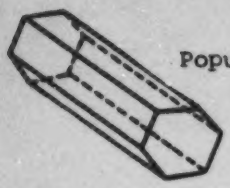
Special interests and/or hobbies
Reading habits
Unusual accomplishments
Relationships with others
Preferred activities when alone
Special talents

Teacher nomination forms may focus on:

Questionning behaviors
Plans for projects
Alertness
Knowledge about specialized subjects
Boredom with traditional curricula

Additional insights into the nature of giftedness is gained from interviews with parents of intellectually gifted students who have provided the following comments:

-He reads fluently. His special interests are space (especially moon, stars, gravity, etc.) and anatomy. (Preschool child, age four.)
-He feels that school is wasting his time....
-After an excellent elementary school experience, junior high doesn't provide anything special.
-At times he found class work boring. While in the early grades, at times friends complained about his vocabulary.
-The public school system is not equipped to meet individual needs of gifted children. In our school district, present priority is solely on "remedial" and bringing up the level of slow achievers. Any demand to meet the special needs of advanced pupils is equated with racism. There is unhealthy political atmosphere.
-Nothing was done during grade school, except to recommend a private school. Big deal!
-We were told to move out of the district for his best interests.... to protect himself, he has had to internalize some of his feelings because he cannot understand why any person wants to hurt another human being, either verbally or physically.
-Loss of many friends since she was identified as "gifted." Non-gifted children are very nasty to these children.
-Her teacher is comfortable in a standard classroom situation.... It has been shown that she hasn't acquainted herself with students' records from previous years. She is concerned only that they behave in the classroom, and anything that is messy or too much trouble doesn't find its way into the curriculum; thus, there is little room for student participation.



Population 5

-Creative writing, he has an excellent command of language; raises animals and birds; gardens--loves growing things; he follows the stock market; radio-controlled model airplanes. (Twelve year old boy)

-Teachers, especially male, used ridicule to keep him in his place when he introduced notions and challenges from his own reading. Others mismarked papers and forced him to justify answers at length....He has become cynical about school as a place to learn about respect for learning among his agemates. He now tries for approval as an expert on cars, hi-fi's, cameras, etc. He feels safest among much older kids and adults.

-Was classified as hyperactive by teacher and principal in first grade so they wouldn't accept him in gifted program until I took him for an EEG. The doctor said he was just bored and not getting challenges and was not hyperactive--but they still have not, as yet, placed him in any program. (Parent's additional comment: He works with a microscope two or three hours a day; reads many books--also chemistry, loves reading of plants, rocks, evolution, etc.)

-David is our "lawyer!" He analyzes, grasps ideas quickly, remembers well. Natural science, living things interest him. Also he collects stamps, participates in sports and children's theatre (outside of school).

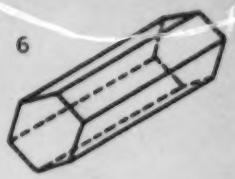
Activity 1.1 Describe two intellectually gifted students you have known.

1.

2.

E_2 The teacher will be able to list characteristics of a qualitatively differentiated unit of study for intellectually gifted students as a result of reading a description and studying examples. (Comprehension)

The qualitatively differentiated unit of study for intellectually gifted students has one distinguishing characteristic - it contains between 20% and 50% higher cognitive behaviors. The content is irrelevant and may be drawn from a variety of sources including standard curriculum guides, teachers favorite hobby, current events, and/or student interest. Units of study, for example, completed by teacher's of the gifted have included: Butterflies, Feelings, Nouns, New England States, Horrors, Maps, Medieval Days and Sensory Awareness.



Historical Fiction

Historical Fiction as a literary genre is one of the most valuable literary forms for students to study. By definition, it is fiction based on history, and so, is reality based. Through reading and discussion of Historical Fiction, students gain insight into the lives and times of famous figures of the past. Understanding one's heritage, and the lives of others tends to contribute to self-knowledge. Moreover, a "sense of history" can contribute to daily problem-solving by increasing the number of alternatives through broadening one's perspective.

The study of historical fiction is particularly appropriate for gifted students because a great deal of it has been written about gifted people. The study of these gifted individuals of the past may serve to help the gifted student recognize and accept his strengths, and his weaknesses. This study may also provide the gifted student with interesting role models.

The process of writing historical fiction requires convergent production, a higher level cognitive behavior. All the "fictionalized" details must be consistent with the actual historical setting. Writing historical fiction requires sophisticated analytical and imaginative skills.

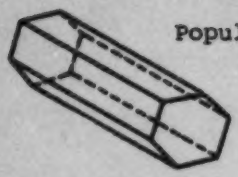
It will be a challenging task for gifted students to analyze the attributes of historical fiction and to try on their own to follow some historical facts in producing a historical fiction short study.

Activity 1.2 List the distinguishing characteristics of qualitatively differentiated unit of study for intellectually gifted students.

Presented below is another example of a rationale from units of study prepared by teachers of gifted students in the Monroe County Project.

Exploration

A unit of study on exploration, for 6th grade, intellectually gifted students has been selected because it offers extensive opportunities for research, comparing and contrasting, speculation and role-playing. The diversity of explorations from space, to inside the brain, to historical sea voyages provides a broad range of topics for individual investigation. Regardless of the specific topic selected by individual students, there are opportunities for gathering basic information, applying information to different time periods and types of explorations, and opportunities for speculation on future exploration and role-playing around famous explorers of the past, present, and future.



Population 7

Exploration is the basis for advancing our knowledge. It is a process that involves risk-taking and values focusing on the need to be different - to be unique - to pursue one's own interests. In brief - exploration is putting intellectual talent to work in productive tasks.

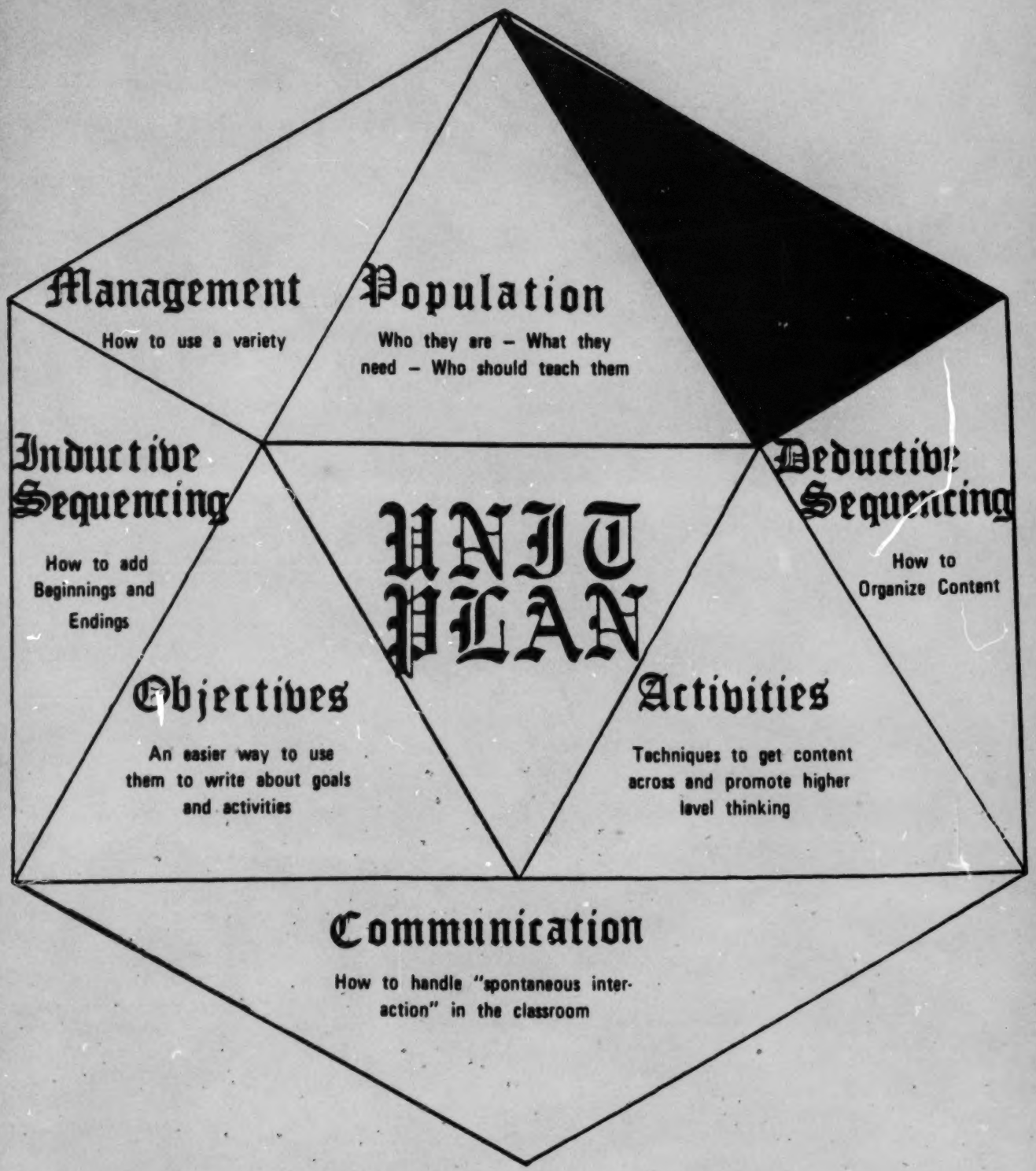
Terminal Task

a. Select a topic for your unit of study.
b. Write a rationale for your unit of study.

Does your rationale:

1. Briefly describe opportunities to gain and process information? _____

2. Describe why the study of this topic is relevant to any individual's life? _____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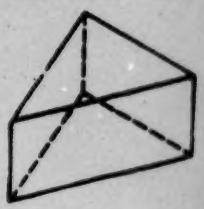
T The teacher will be able to demonstrate comprehension of Bloom's taxonomy by correctly identifying the cognitive category of learning behaviors. (Comprehension)



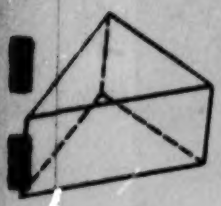
Rationale

In 1956, Benjamin Bloom and several others developed a taxonomy of cognitive behaviors. Although the hierarchy was specifically designed to facilitate construction of questions designed to measure student achievement, it has been extremely useful in organizing curricula. The hierarchy is particularly useful in a program for gifted students for three reasons. First, the cognitive behaviors specified in the hierarchy form the basis for learning beginning with basic knowledge and comprehension levels and extends to the higher cognitive behaviors of analysis, synthesis, and evaluation. Gifted students quickly master knowledge and comprehension level objectives leaving far more time for higher cognitive behaviors than normally available with regular classes. Second, the hierarchy clearly delineates observable behaviors. This clarity of expectations is imperative if students are to eventually become academically independent and self-directing.

Furthermore, the taxonomy provides specific categories of cognitive behaviors which may be directly taught. Not only are learning tasks at different levels operationalized within the taxonomy, but the cognitive behaviors of analysis, synthesis and evaluation are sufficiently well defined to be taught as discrete skills. Bloom's taxonomy provides not only a framework for organizing a curriculum but serves also as a basis for teaching skills that gifted students may use in ordering their own thinking.

E_1 The teacher will be able to order six categories of cognitive behavior after examining verbs and definitions commonly associated with each category. (Knowledge)

Bloom presents six categories of cognitive behaviors. They are hierarchical, i.e., each category subsumes the preceding ones, with the exception of evaluation which may be utilized in conjunction with any of the preceding levels. The following is a listing of the categories and a brief description of each.



Knowledge

Knowledge level behaviors generally require the recall of information previously accumulated by the student. Factual data, dates, names, places, and processes are frequently encountered at this level. Memorization is the primary issue at this level of cognitive behavior.

Examples of acts requiring Knowledge.

When did Columbus discover America?
Identify the capitol of New York State.
Name three trees common to this area.
State the definition of a "noun."
List the steps used in applying the scientific method.

Verbs generally used in knowledge level objective.

define	identify	recall	recognize	matches
states	select	acquire	lists	distinguish
labels	names			

Comprehension

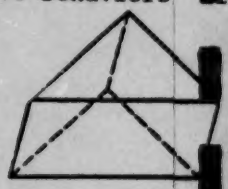
Comprehension level behavior generally represents an understanding of material. It is manifested in restating, interpreting and/or extending. The ability to restate information in ones own words generally denotes comprehension. Explanation and extension of trends or tendencies are also classified as comprehension level behaviors.

Examples of acts requiring Comprehension.

Converting a math problem into an equation.
Explaining the process of precipitation.
Interprets information presented in graphic form.
Give examples of proper nouns.
Paraphrase the conversation between two characters in a given book.

Verbs generally used in comprehension level objectives.

translate	illustrate	read	represent
change	defend	rephrase	rewrites
restate	extends	interpret	reorder
estimate	paraphrase	converts	gives
examples	summarizes		



Application

Application level behaviors generally require the use of abstractions, general rules and/or general methods in a specific ituation. Generalities are used to explain and/or demonstrate ability to deal with specific cases.

Examples of acts requiring Application.

Prepare a demonstration of the rain cycle.
Diagram a sentence.
Identify an unknown tree using a taxonomic key.
Construct a sentence according to some prespecified criteria.

Verbs generally used in application level objectives.

produce	apply	generalize	relate
choose	employ	discover	modifies
organize	operate	solves	use
manipulates	computes	restructure	classify

Analysis

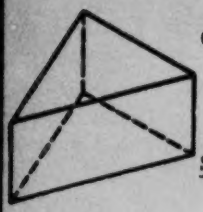
Analysis is cognitive behavior directed at the internal characteristics of some stimuli. The stimuli may include such items as; communications, objects of art, formal arguments, plans, problems, buildings, etc. Internal characteristics may include elements, relationships, organizing principles, structure, etc. Basically, analysis focuses on the isolation of internal characteristics for purposes of intensive investigation and/or identifying interrelations.

Examples of acts requiring Analysis.

Discriminate between a deductive and an inductive argument.
Discriminate between a premise and a conclusion.
Arrange a set of randomly presented pictures into an appropriate sequence.
Discriminate between a triangle and a trapezoid.
Isolate pieces of information required for solving a particular problem.
Identify the probable traffic flow in a house plan.
Describe the relationship between two dissimilar objects (e.g. paper clip and nail).
Solve an analogy.
Identify the bias of a particular author.

Verbs generally used in Analysis level objectives.

discriminate	categorize	deduce	compare
subdivide	distinguish	analyze	contrast
separate	diagram	breaks down	



Synthesis

Synthesis is a cognitive behavior in which two previously unassociated elements are brought together. The result is a new, undefined relationship. The unique product is the expression of this relationship.

Examples of acts which may result in synthesis behaviors are:

Write a short story about a pink turtle.
Write a poem on something unpoetic.
Develop a hypothesis to explain something unexplained.
Design a plan for world peace.
Build a model village of a settlement on Mars.
Draw a picture emphasizing the wrong things.
Develop a formal argument for buttering toast from the center outward.

Note - Synthesis is often thwarted because of a schooling emphasis on correct answers. Synthesis can be fostered by encouraging development of alternatives. This of course leads to creativity i.e.

fluency - a number of alternatives
flexibility - a number of different alternatives
originality - a number of unique alternatives.

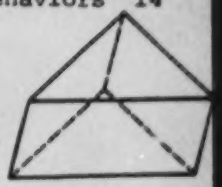
List as many uses for a brick as you can.
List as many reasons for a given occurrence as you can.
Draw as many pictures using a square for the starting point as you can.

Verbs generally used in Synthesis level objectives.

compile	tell	produce	transmit
write	create	summarize	constitute
modify	document	formulate	originate
reorganize	generate	design	

Evaluation

Evaluation is cognitive behavior requiring a judgement of worth. Stimuli being evaluated may be judged externally or internally. External evaluation requires comparison of the stimuli with some external criteria or standard, that is, some standard that exists entirely separately from the stimuli being evaluated. Internal evaluation requires an examination, of internal consistency or organization within the stimuli.



Examples of acts requiring Evaluation.

Determine which of five shapes on the left is most nearly like the one shape on the right.
Are the stated premises sufficient and necessary for the conclusion?
Determine if the geometric shape given on the left is a composite of individual shapes given on the right.
Determine which paintings incorporate basic principles of design.
Determine which narrative selections include basic principles of science fiction.
Judge, according to principles of logical reasoning, the adequacy of a given argument.
Determine the probability of the correctness of an answer to a given problem.

Verbs generally used in evaluation level objectives.

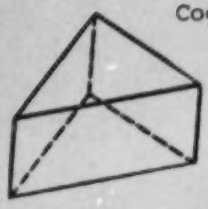
judge	argue	consider	validate
decide	standardize	compare	contrast
appraise	assess	criticize	support
justify	explain		

Task 2.1: Presented below are behaviors commonly used in describing curriculum activities. Locate and circle the six cognitive behaviors from Bloom's Taxonomy.

Memory	Comparisons	Reasoning	Application
Interpretation	Evaluation	Creativity	Recognition
Knowledge	Conclusions	Synthesis	Conjecture
Divergence	Analysis	Explanation	Translation

Rank the six cognitive behaviors you circled above from the most basic to the most difficult.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____



E_2 The teacher will be able to write descriptions of six cognitive categories based on recall from previous activities and/or study of additional references. (Comprehension)

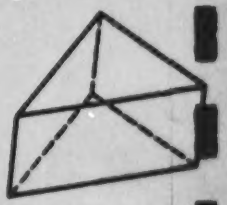
Each of us is a unique individual by virtue of our genetic inheritance and environmental nurturance. By virtue of our individual sets, we encounter and process information in many different ways. Objective 2.2 asks you to translate the information presented to you in Bloom's Taxonomy into your own vocabulary. It is essentially a paraphrasing task; i.e. the restatement of information for the purposes of clarification.

If you need further information and clarification on the categories, you are referred to the original sources listed below, or one of the other references which offer a treatment of the information.

Bloom, B.S.; et.al. Taxonomy of Educational Objectives: Handbook I, The Cognitive Domain. N.Y.: David McKay Co., 1965, pp. 201-207.

Hunkins, F.P. Questioning Strategies and Techniques. Boston: Allyn and Bacon, Inc., 1972.

Sanders, N.M. Classroom Questions: What Kinds? New York: Harper & Row, 1966.



Examples of Behaviors Representing Each of the Cognitive Levels of Bloom's Taxonomy

Knowledge

1. Recognize a Shakespearean sonnet in a group of sonnets.
2. Recall biographical information on Abraham Lincoln.
3. Identify hexagons and octagons.

Comprehension

1. Read musical scores.
2. Write two-page book report.
3. Interpret information from a map.

Application

1. Present ideas in written form in accordance with principles of grammar.
2. Use math skills to figure cost per year of electricity for one's own family.
3. Explain why the weather forecast is for rain.

Analysis

1. Given a list of statements about a story, distinguish between a conclusion and the statements which support it.
2. Identify the motives of the main character in . . .
3. Infer the author's viewpoint.

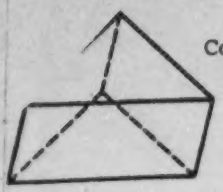
Synthesis

1. Develop a tentative hypothesis based on the data collected.
2. Identify possible ways in which experiences may be organized to form a conceptual structure.
3. Express your own ideas in writing with clarity and correctness.

Evaluation

1. Determine the validity of the President's arguments for tax reform.
2. Identify your own bias in regard to race.
3. Compare the two major theories of the origin of life.

A flowchart to aid in discriminating among cognitive behaviors is presented in the fig. for your use in achieving the final task of identifying cognitive behaviors.



Task 2.2:

Description of the six categories of the cognitive behaviors in the learners own words.

Category	Description

A Flowchart of Bloom's Taxonomy

Stimulus elements are immediately available and student response requires interacting with the stimulus material.

No → Student is required to recall stimulus material.

Yes ↓

Yes ↓

Knowledge

Yes ↑

Student is merely required to demonstrate awareness of the stimuli by rewording, reordering, or rearranging its component parts or decoding coded information.

No → Student is required only to recognize existence of stimulus material, to name it, label it, or identify it.

Yes ↓

No ↓

Comprehension

A multiplicity of responses and/or limited unique responses are possible outcomes of student interacting with stimulus material. May require reference to a multiplicity of stimulus elements.

No ← Student is required to actively interact with the stimulus material, to manipulate variables, apply rules and/or principles and produce one correct answer.

Yes ↓

Yes ↓

Synthesis

A limited number of responses are available depending on how the stimulus material is broken down into its component parts and/or relationships.

No ← Student is required to produce one answer based on comparing stimulus material with an external standard (criteria) or examining the internal consistency of the material.

Yes ↓

Analysis

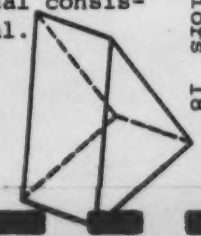
Student is required to produce an answer by manipulating and/or identifying variables according to previously defined rule.

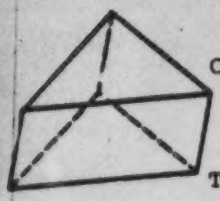
No ←

Yes ↓

Application

Evaluation





Task 2.3:

Identify the cognitive domain category in each of the behaviors below using the flowchart on page 18.

Knowledge - K	Analysis - N
Comprehension - C	Synthesis - S
Application - A	Evaluation - E

____1. Construct a presentation using graphic materials.

____2. Define the technical terms for four common house plants.

____3. Determine the artistic quality of VanGogh's "Sunflowers".

____4. Find the rate of acceleration of a vehicle weighing 2000 lbs. on an incline of 63°.

____5. Interpret sign language.

____6. Identify three cause and effect relationships in the one-family society of Swiss Family Robinson.

____7. Act as group facilitator to coordinate suggestions, suggest solutions, and orient these to the goals of the group.

____8. Recognize the meanings of the names of common punctuation marks.

____9. Read German. (in German)

____10. Identify reliable sources of information for wise purchasing.

____11. Compare two other IQ tests with the Stanford-Binet.

____12. Predict the effect of another oil embargo.

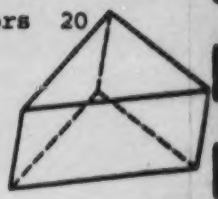
____13. Identify the method of inquiry Sherlock Holmes uses in the story...

____14. Verify the accuracy of the proof for the Pythogorean theorem.

____15. Restate main idea of the poem "Jabberwocky" by Lewis Carroll.

____16. Given the economic conditions of a country, determine what policy might be most effective.

____17. Devise an experiment to test the hypothesis that transcendental meditation can enable one to transcend gravity.



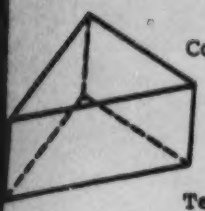
Answer Key (Task 2.3)

Task 2.1 - Review E_1

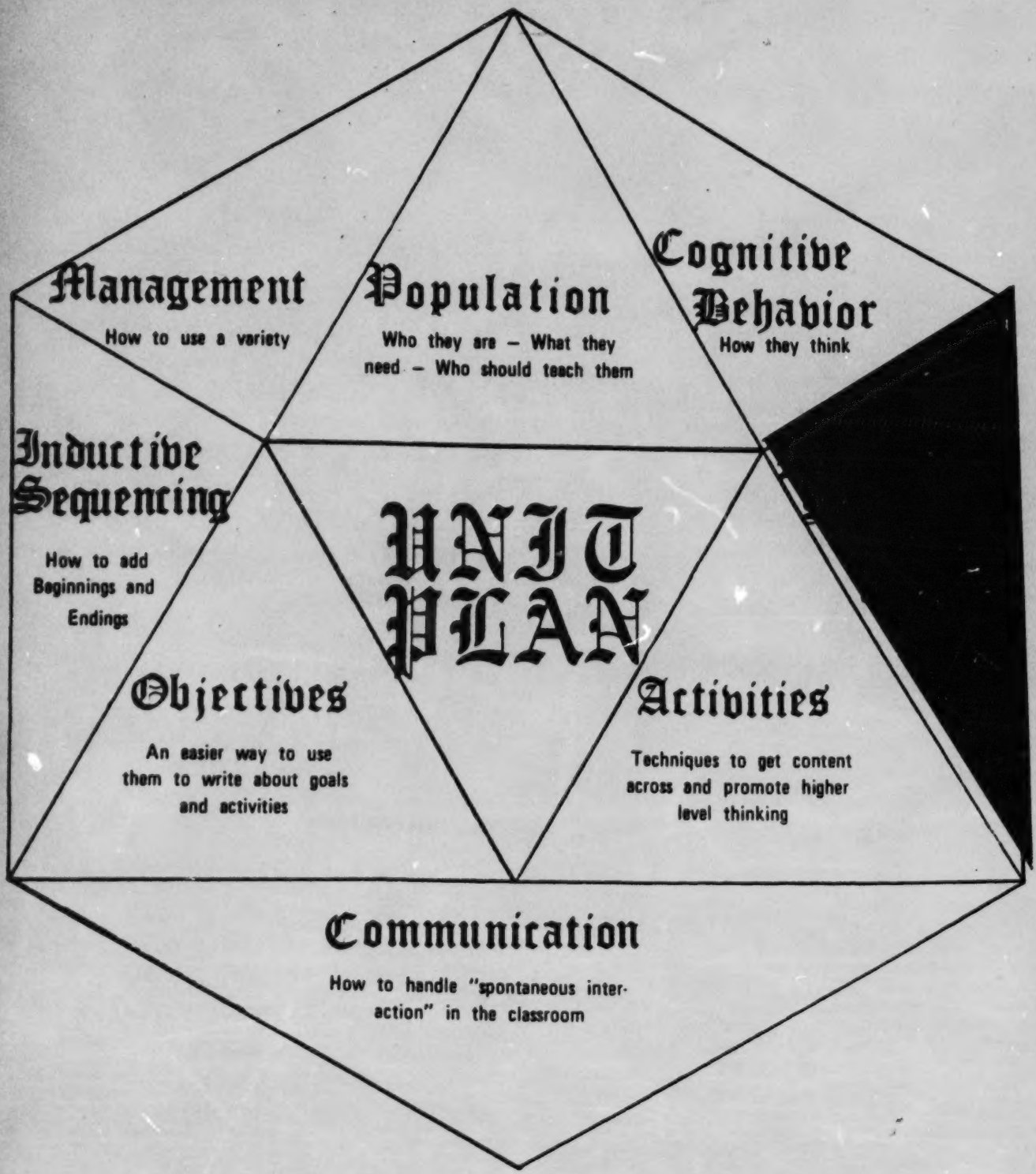
Task 2.2 - Review E_1

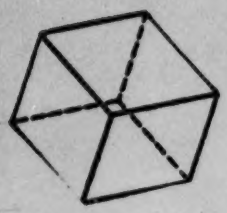
Task 2.3

1. S, New product
2. K, Recall of a definition
3. E, Criteria is artistic quality
4. A, Applying a formula
5. C, Rephrasing
6. N, Examination of internal relationships of the society
7. S, Requires new solutions
8. K, Simple recall
9. C, Translating written symbol into sound
10. E, Criteria is reliable/unreliable
11. N, Examination of elements of each
12. S, Hypothesis generation
13. A, Requires applying K of inquiry techniques to the new situation presented in the story
14. E, Criteria is accuracy
15. C. Rephrasing
16. A, Using K of economic policy
17. S, Requires hypothesis generation



Terminal Task - List verbs which indicate the cognitive behaviors you plan to include in your unit of study. Check to make sure you have included approximately 50% higher level cognitive behaviors in your list. Does your list contain observable behaviors? Can you identify each behavior according to its cognitive level as defined by Bloom?


Management
How to use a variety
Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
UNIT PLAN
Objectives
An easier way to use them to write about goals and activities
Activities
Techniques to get content across and promote higher level thinking
Communication
How to handle "spontaneous interaction" in the classroom



Module 3

Concepts and Deductive Sequencing

T The teacher will be able to isolate relevant concepts in a topic and identify related multiple discriminations, rules, and problems.

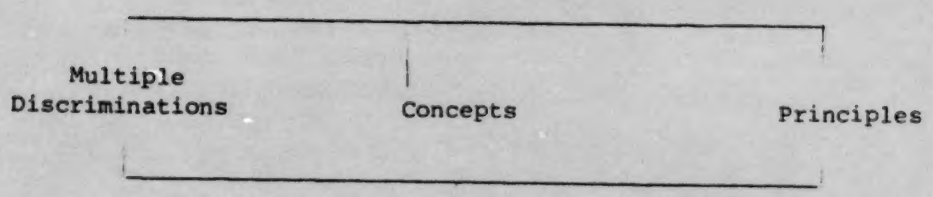
E_1 The teacher will be able to recognize examples of multiple discriminations, concepts, principles and problems as a result of studying definitions and practicing discriminations. (Comprehension)

E_2 The teacher will be able to identify concepts as a result of studying and practicing examples. (Comprehension)

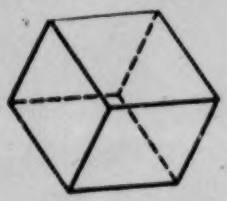
E_3 The teacher will be able to recognize concepts embedded in rules as a result of examining rule formation and rule definitions. (Knowledge)

E_4 The teacher will be able to deductively organize enabling objectives by studying examples and practicing simulated hierarchies. (Application)

Content Analysis of Objectives



Gagné



Module 3

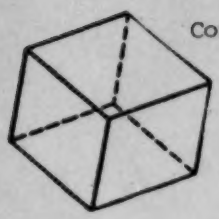
T The teacher will be able to isolate relevant concepts in a topic and identify related multiple discriminations, rules, and problems.

Rationale

Robert Gagné, in his book, Conditions of Learning, (1965) describes eight levels of learning. The eight levels are hierarchical, that is, each level is dependent upon mastery of lower levels. Knowledge of the eight levels as defined by Gagné, is extremely useful in deductively organizing learning tasks designed to assist students in mastering terminal objectives. Because the system is hierarchical with problem solving at the eighth or highest level, it seems particularly appropriate to examine this model in preparation for dealing with intellectually gifted students.

The first two levels in the Gagné hierarchy generally occur during pre-school years and it is only the six higher levels that will concern teachers of the gifted.

Qualitatively differentiated instruction is facilitated by clear identification of the content to be mastered. Gagne's hierarchy provides a framework for describing content. By reducing a topic to concepts, principles, and problems, and combining these with the verbs describing cognitive behaviors, the objectives of instruction are formed. Instructional tasks can therefore be designed to move from simple to complex in terms of both the content and the cognitive behavior required.



E_1 The teacher will be able to recognize examples of multiple discriminations, concepts, principles and problems as a result of studying definitions and practicing discriminations. (Comprehension)

(Note: The following represents only an introduction to the eight levels of learning. You may find it desirable to refer to Gagne's book for further information.)

Level 1, Signal Learning, and Level 2, Stimulus response learning; rarely occur in a pure form in humans and are not relevant for our study of academically gifted students.

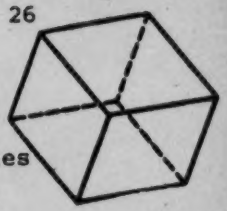
Level 3 - Motor chaining (MC) - A connection of motor responses such that one response triggers the mechanism for the next response. Riding a bicycle, typing, and driving a car represent motor chains.

Level 4 - Verbal chaining (VC)- A chain of verbal responses such that one response triggers the mechanism for the next response. Memorizing the alphabet, counting and memorizing poetry are examples of verbal chains.

Level 5 - Multiple discrimination (MD) - The ability to separate objects based on distinctive features, e.g. to recognize triangles as different from squares, doors as different from windows, and letter A's as different from letter B's.

Level 6 - Concept (C) - Concepts have names or labels and a set of defining attributes (definition). Exemplars (examples) of concepts form classes or groups. Triangle is a concept. Triangle is the label or name for a group or class of two dimensional, closed figures formed by three rays (lines) intersecting at three points. Parable is a concept. Parable is the name for a literature form in which some basic truth or moral is presented in a narrative style. Measurement is a concept. It is defined as the comparison of standard units with unknown quantities to produce a quantitative index. Although measurement in itself is a concept, it is frequently related to other concepts, e.g. area, perimeter, etc. Concepts may be concrete (directly observable) or defined, i.e. based on abstract definitions.

Level 7 - Rules, Principles (P)-Concepts may be joined together to form rules or principles. "Triangles have area and a perimeter" is a principle composed of three concepts (underlined). "Capitalism cannot occur in a socialist state" is a principle composed of four concepts (underlined). Uniting concepts to form new rules or principles is a critical behavior required for problem solving.



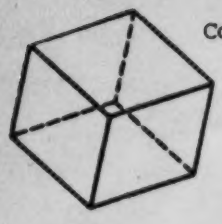
Level 8 - Problem Solving (PS) - An ability to use rules in generating hypotheses. Hypotheses are new, higher order rules that, in and of themselves, form new rules. This level implies a strategy for application of rules in response to a question.

Examples : listed below are several tasks with level of learning identified for each task.

	Task	Level of Learning
1.	Collect all three sided figures.	MD
2.	Recognize a satire.	C
3.	Move 3 matchsticks and change 5 squares to 3 squares.	PS
4.	Recognize a flower.	C
5.	Find a procedure for determining the area of a triangle.	PS
6.	Apply the formula for measuring circumference of a circle to the following problems.	P
7.	Match the following names of trees with their leaves.	C
8.	Group coastal features from a topographical map into different groups.	MD

Task 3.1 - Listed below are several tasks, identify the level of learning associated with each.

1. Recognize the letter C as different from other letters. _____
2. Separate all numeral "8" from a pile of mixed numerals. _____
3. Point to "edge" in a diagram of a cube. _____
4. Find a formula for the cumulative sum of N terms in a series. _____
5. Describe the attributes of government. _____
6. Develop a list of attributes for "Science fiction". _____
7. Determine who in your environment is manipulated and who manipulates. _____
8. If Jack has 5 apples and gives away 2, how many does he have left? _____



E_2 The teacher will be able to identify concepts as a result of studying examples and following a set of guidelines.

Concepts form the basic core of learning. They represent the key for more sophisticated problem solving and serve as a focal point for prior learning. Learning activities may be efficiently anchored to concepts. Once concepts to be learned have been thoroughly clarified, then prerequisite multiple discriminations may be taught and subsequent principles and problems may be examined. The key is to reduce curriculum content into its basic concepts and then insure that prerequisite multiple discriminations have been mastered and opportunities for relating concepts (forming higher order rules) in problem solving tasks are available.

The curricular area of measurement can be broken apart into several component concepts.

Concepts:

1. Standard unit - the structural basis for each type of measure, e.g. inch, pound, meter, etc.

2. Weight - pull of earth's gravity on any given mass.

3. Length - a linear measure of the shortest dimension of any two dimensional shape.

4. Perimeter - length of the boundary used to enclose a two dimensional space.

5. Area - a measure of two dimensional space within the boundaries of a closed figure.

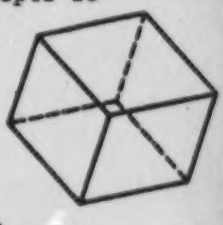
Ask yourself for each concept if it is clear what items would be included in the set of exemplars and the set of non-exemplars.

The definitions for concepts may be derived from a variety of sources. Dictionary definitions represent one starting point, authorities within the particular discipline have often developed more refined definitions, and curriculum guides will usually contain those definitions that are found on standarized tests.

It is important to distinguish between being able to recall the definition of a concept and mastery of the concept. Memorizing the definition of a concept is nothing more than a verbal chain and is unrelated to mastery of the concept. Concept acquisition is demonstrated by using the concept as a skill, or finding exemplars of the concept and distinguishing them from non-exemplars. Memorizing the lables for concepts, although required for abstract communication about the concept, is no substitute for using the concept in developing principles or solving problems.

Here is another set of concepts related to simple machines.

1. Work - effort directed to produce movement.



2. Wedge - a solid in which two principle faces are joined in an acute angle.

3. Inclined Plane - a slanting, flat surface.

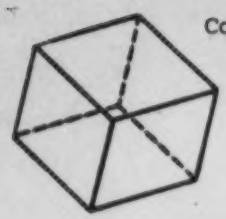
4. Force - a measure of the amount of effort being directed in a given direction.

5. Resistance - any force to be overcome in the movement of objects.

Labels are underlined and definitions follow. Test them. Can you clearly distinguish between exemplars and non-exemplars?

Task 3.2 - List five concepts. Define the concepts. Determine whether each concept is concrete or abstract. Could anyone divide stimuli into sets of exemplars and non-exemplars based on your definition?

Label	Definition	Examples of Exemplars	Examples of Non-exemplars
1.			
2.			
3.			
4.			
5.			



E_3 The teacher will be able to list multiple discriminations required prior to forming concepts as a result of studying definitions and practicing examples.

Before a learner can effectively deal with a concept, he must be able to distinguish that exemplars belonging to the class actually do possess characteristics that differentiate them from non-exemplars. It is extremely difficult, for example, for a student to master a concept of triangle if he is unable to recognize that a triangle is different from a square. Recongizing that a triangle is indeed different from a square does not require a definition of either a square or a triangle. All it requires is an opportunity to separate objects based on shape. If the student can separate triangle into a single class based on an idosyncratic sorting strategy, then he has demonstrated ability to discriminate triangle. He may then go on to learn that triangles represent a unique class of figures with a specific set of defining attributes and that there are a wide variety of triangles that may be considered exemplars of the concept. (See an article on concept acquisition in the Arithmetic Teacher, "Cognitive Formation", Nasca, December, 1978)

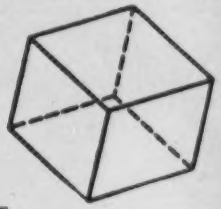
Multiple discrimination tasks generally provide students with opportunities to deal with exemplars and non-exemplars of a concept before any concept names, labels, or definitions have been introduced. Sorting or classifying tasks require students to develop strategies of their own for separating and grouping sets of objects. The outcome of sorting tasks will generally illustrate how capable a student is of distinguishing the minor differences which are required for mastery of a concept.

Gagne (1965) stresses the significance of multiple discrimination prior to concept formation. Piaget also provides considerable evidence for the importance of this sequence. His concrete operational stage as a precurser to formal operations is extremely consistent with the Gagne hierarchy. Direct experience with real materials in making multiple discriminations is extremely important if we expect children to "conceptualize or to be able to form their own concepts. To clarify what concept formation is try this out with a colleague - "What is the difference between teaching a concept and forming a concept?"

Below are two examples of multiple discriminations that may be used as prerequisities for the concepts of standard unit and weight.

Example A - Concept - Standard Unit

The student must be able to discriminate between standard units and non-standard units. This may be accomplished by having students measure objects with any units of their own choosing and comparing results. Students who recognize that comparisons between different objects can be made only if the same unit of measure, e.g. paper clips, nail, etc. was used to measure both objects, are ready to deal with the concept of standard unit in its abstract sense, i.e. name, label, definition and defining attributes.



Example B - Concept - Weight

A student must be able to recognize that some objects are "heavier" or "lighter" than others, i.e. press down harder, are pulled toward the floor harder or with more force - whatever his language might be, before he can be expected to deal with weight as a discrete concept. Experience with weight as an attribute of objects and the fact that different objects are heavier or lighter are discriminations that should be made prior to formal measuring of weight.

Task 3.3 - List the multiple discriminations a student would be required to master before the following concepts could be mastered:

Numeral

Poem

Westard Expansion

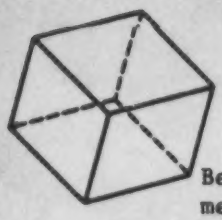
Friendship

Analysis

E_3 The teacher will be able to recognize concepts embedded in rules as a result of examining rule formation and rule definition.

Concepts serve two primary functions. First they serve as organizers of real objects and ideas in our environment. These organizing entities (concepts) may be learned, that is, the labels, defining attributes and lists of exemplars and non-exemplars may become known (memorized) by students. Or, students as we have already seen, may be encouraged to form concepts based on their own observations. This latter task incidently is far more appropriate for gifted students than the former, i.e. mere knowing about concepts.

Secondly, concepts may be joined together in meaningful relationships to form principles (rules). Two or more concepts joined together in a hypothetical relationship constitutes a hypothesis. If the relationship is validated, then the hypothesis becomes a formal rule or principle. Using these formal rules and principles in new situations is the cognitive behavior of application.



Below are examples of feasible relationships between concepts from the measurement topic. Students may be required to validate the relationships if they exist or prove that they do not exist. Students may also be invited to generate their own sets of relationships. (synthesis cognitive behavior)

Example - Concepts within the measurement topic, e.g. standard unit, weight, length, area, perimeter may be randomly combined to see if meaningful relationships emerge. For example, are there any consistent relationships between the following:

length and area ($l \times w = a$)

perimeter and area ($p = a$)

width and length (no relationship)

weight and standard unit (weight measured by standard units like pound, ounce, etc.)

Or, illustrate how the standard unit for each type of measure may be related to other standard units.

e.g. square inch and inch, (in, in^2)
yard and square yard, (yd, yd^2)
ounce and inch, (unrelated)
pound and inch, (unrelated)

Or, problems may be constructed in which the solution requires joining two or more concepts.

e.g. Find a linear relationship between any two measures of a circle. (Analysis, radius and diameter, $2r = d$)
Find a non-linear relationship between any two measures of a square. (Analysis, length of a side and area, $l \times w = a$)

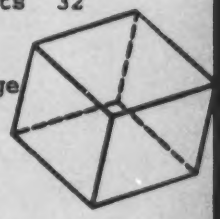
Task 5.4 - Underline the concepts in the following rules.

a.) The area of a triangle equals ½ of the product of the base and height.

b.) A cinquain is a five line poem constructed such that:
1st line - one word - noun
2nd line - two words - adjectives
3rd line - three words - feeling
4th line - four words in a phrase related to line 1
5th line - one word - synonym for line 1

E_4 The teacher will be able to deductively organize enabling objectives by studying and practicing examples.

The arrangement of learning activities in a hierachical sequence from simple to complex tasks is classified as a deductive approach to unit development. It begins by isolating key concepts followed by insuring that students have the preresquite multiple discriminations and then move toward rule development based on combining concepts, and eventually into problem solving. Problem solving (at least one type) requires the application of specific rules.



Task 3.5 - Presented below are sets of randomly arranged tasks. Arrange these tasks into a deductive hierarchy.

Set 1.
a. Solving word problems.
b. Discriminating between four arithmetic operations.
c. Converting word sentences to number sentences.
d. Discriminating between open and closed number sentences.
e. Ability to define arithmetic operation indicated by symbols for addition, subtraction, multiplication and division.

Deductive order _____ _____ _____ _____ _____
1st last

Set 2.
a. Discriminating between punctuation marks.
b. Constructing a paragraph.
c. Discriminating between a topic sentence and supporting sentences.
d. Discriminating between questions and telling sentences.
e. Defining a sentence.
f. Discriminating between a complete sentence and a phrase.

Deductive order _____ _____ _____ _____ _____
1st last

Terminal Task

1. Identify the concepts in the topic you have selected and write a clear definition for each concept.

2. Identify multiple discriminations, and/or verbal or motor chains required prior to mastering these concepts.

3. List possible rules or principles and problems that may be developed or solved based on these concepts.

*4. Write at least one higher level thinking task for each concept.

*5. Write a task which would require the formation of a principle or problem (synthesis level cognitive behavior).

*optional

Answer Key

Task 3.1

1. MD
2. MD
3. MD
4. PS
5. C
6. C
7. PS
8. PS

Task 3.2

Check with instructor.

Task 3.3 - Listed below are some of the multiple discriminations required.

Numeral
1. Groups are different as a function of the number of objects in the group.
2. Number names have different configurations.
3. One-to-one correspondence.
   4 = ▫▫ ▫▫ 2 = o°

Poem
1. Message-carrying communications and nonsense.
2. Prose versus poetry.

Analysis
1. Cognitive behaviors are different from affective behaviors.
2. Cognitive behaviors range from simple to complex: knowledge, comprehension, application, analysis, synthesis, evaluation.
3. Discriminate between part and whole.

Westward Expansion
1. Discriminate between occupied and unoccupied territory.
2. Discriminate between perspectives (Indian versus white man).
3. Physical movement versus stationary position.

Friendship
1. Discriminate between positive and negative emotions and their manifestations.
2. Discriminate among friendship and other positive relationships.

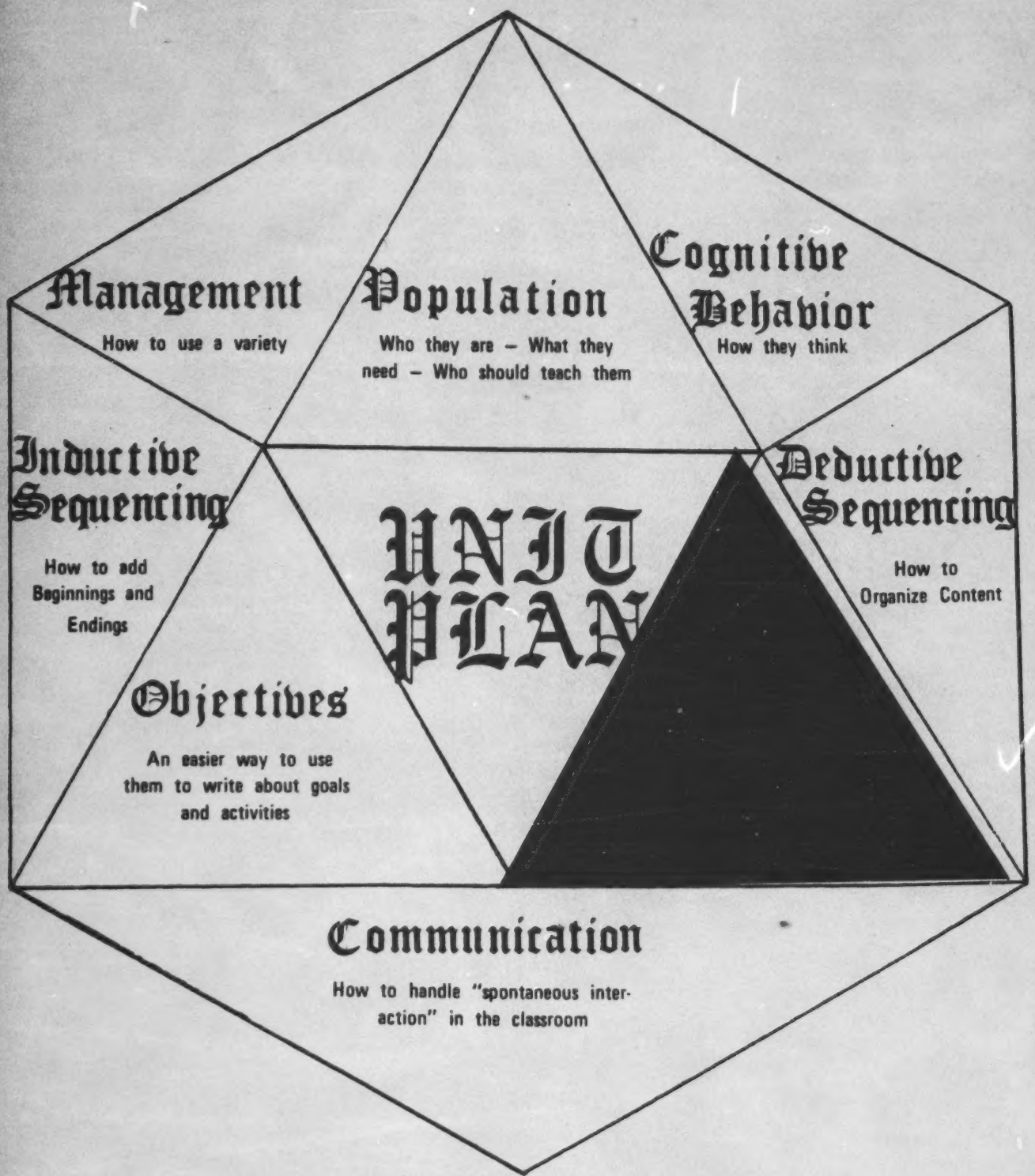
Task 3.4

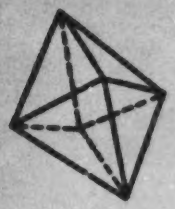
1. area, triangle, equals, 1/2, product, base, height.
2. cinquain, five, line, poem, constructed, 1st, line, one, word, noun, 2nd, line, two, words, adjectives, 3rd, line, three, words, feeling, 4th, line, four, words, phrase, related, line, 1, 5th, line, one, word, synonym, line, 1.

Task 3.5

Set 1 b, e, d, c, a

Set 2 e, f, a, d, c, b


Management
How to use a variety
Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
UNIT PLAN
Deductive Sequencing
How to Organize Content
Objectives
An easier way to use them to write about goals and activities
Communication
How to handle "spontaneous interaction" in the classroom



Module 4

Activities

T The teacher will be able to write activities on six cognitive levels using one of the three systems outlined in this module as demonstrated by writing activities for the concepts of his topic. (Application)

And one of the following:

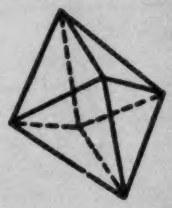
T_a The teacher will be able to use "Blooming with Bloom" to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

T_b The teacher will be able to use the matrix system to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

T_c The teacher will be able to use the Williams' strategies to write activities on six cognitive levels by writing six (6) activities for each concept. (Application)

Activities

Blooming with Bloom | Matrices | Williams' Strategies



T The teacher will be able to generate a variety of activities representing the range of cognitive behaviors as demonstrated by doing so on a topic of his choice.

Rationale

Thus far in this instructional system, you have identified a topic for a population of gifted students, examined the cognitive behaviors appropriate for that group, and identified concepts within the topic to be taught.

The three techniques offered in this module are all designed to provide a systematic approach for generating activities for the identified concepts within your topic. You are asked to write activities on all six cognitive levels for several reasons. Although you will be using primarily higher level thinking activities with gifted students, whenever they have difficulty it may be helpful to suggest a less complex activity as preparation for eventual completion of the more difficult task. In addition, in beginning with knowledge level activities you clarify the knowledge base you require. A clearly delineated knowledge base is helpful in evaluation. Finally, writing activities at all levels will help you in recognizing exemplars and non-exemplars of the concepts of the cognitive behavior.

Task

Three systems are offered in this module for generating activities on a topic. The terminal objective for this module requires that you choose one of the three systems and generate activities on the topic you have selected.

T_a is a system which provides verbs and products for each cognitive behavior. When combined, these can be used to write a variety of activities.

T_b is a matrix system. One matrix uses the two dimensions of concepts and cognitive behaviors. The other focuses on the cognitive behavior of synthesis as one dimension, and alternative modes of expression as the other.

T_c is a system of 18 strategies based on the work of Frank Williams. It uses techniques such as analogies, paradoxes, and discrepancies to generate activities.

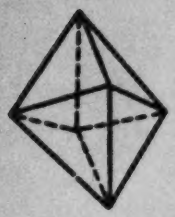
To determine which of the systems you would prefer to use, read through this module and try generating a synthesis activity from each system on a concept for your topic; then choose one terminal objective to fulfill by writing activities on all cognitive levels for all topics.

Concept:_____

"Blooming" activity:

Matrix activity:

Williams activity:



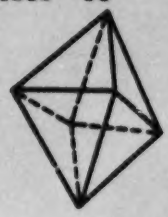
"Blooming with Bloom"

T_a The teacher will be able to use "Blooming with Bloom" to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

E The teacher will recognize the parts of the flower as a result of reading a description of them. (Knowledge)

E_2 The teacher will complete activities for the six cognitive levels using the flower, as a result of studying examples. (Comprehension)

Blooming with Bloom



recommendation
letter
group discussion
panel
news item
survey
court trial
conclusion
value
self or other-evaluation
editorial
critique events
speakers
models

evaluate
judge
debate
story
discuss
editorialize
news article
decide
recommend
TV, radio show
choose
support
justify
poem, cartoon
combine
argue
validate
assess
new game
compile
write
recipe
invent
compose
product
predict
hypothesize
estimate
infer
play
create
produce
advertise-
ment
originate
generate
pantomime
formulate
design
new color
imagine
song, new tune
classify
puppet show
discriminate
deduce
compare
contrast
separate
subdivide
graph
diagram
dissect
categorize
survey
survey
questionnaire
plans
commercial
report
divisions
chart
diagram
parts
structure
machine
invention

EVALUATION
COMPREHENSION
SYNTHESIS
APPLICATION
ANALYSIS
KNOWLEDGE

television
people
radio
newspapers
books
magazines
tapes
diagrams
models
records
films
filmstrips
translate
microfiche
illustrate
read
description
represent
rewrite
facts/
opinions
rephrase
restate
interpret
microfilm
reorder
convert
summarize

construct
diary
teach
paint
collection
sketch
relate
puzzle
generalize
use
diagram
employ
compute
photographs
report
simulate
sculpture
diorama
solve
modify
map
scrapbook
manipulate
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stitchery
mobile
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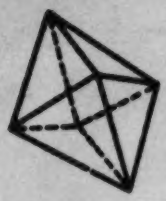
acquire
label
name
distinguish
locate



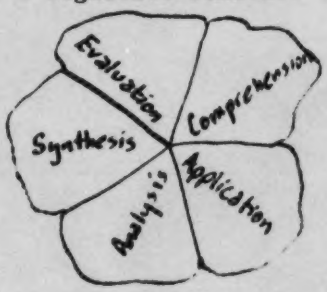
Rationale

"Blooming with Bloom" is a technique for generating activities on a concept. It provides verbs which are commonly associated with each cognitive level, and possible products in an easy-to-use format.

E_1 Teachers will recognize the parts of the flower.

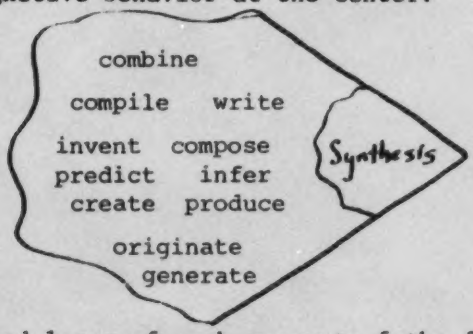
Knowledge is the stem of the flower. Symbolically, it is the basis of all the other cognitive behaviors. The verbs which can be used to indicate a knowledge level objective are given on the leaves.

The center of the flower is made up of five parts. Each part contains a cognitive behavior .

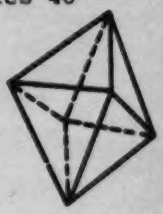


Beginning in the upper right hand corner, comprehension is the lowest cognitive behavior represented in the center of the flower. Higher cognitive behaviors, appropriate for intellectually gifted students, begin with application and continue as one moves clockwise around the flower.

The second layer of each segment of the flower contains the verbs which may be used to generate an activity requiring the cognitive behavior at the center.



The third layer of each segment of the flower contains possible products for that cognitive behavior. More than any other layer of the flower, however, these products can result from more than one cognitive level behavior.

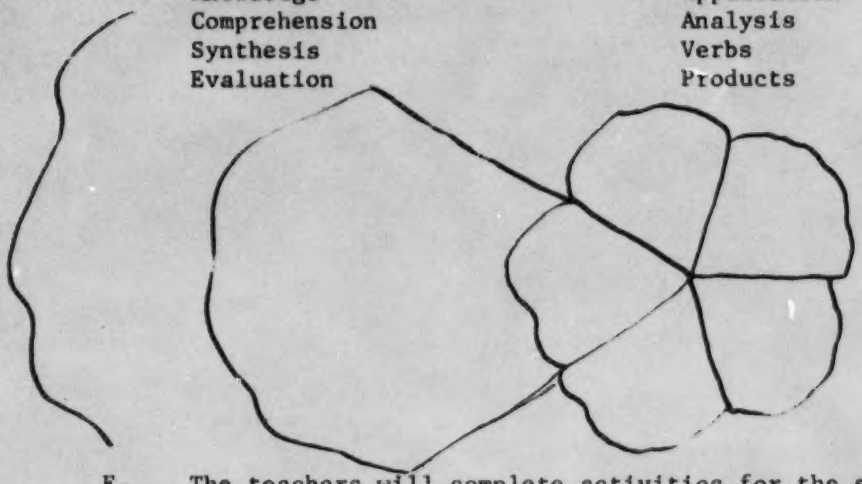


Task 4.2

Label the parts of the flower using the following terms:

Knowledge
Comprehension
Synthesis
Evaluation

Application
Analysis
Verbs
Products



E_2 The teachers will complete activities for the six cognitive levels using the flower, as a result of studying examples.

To generate activities for each concept using the flower, begin with knowledge verbs from the leaves. Choose a verb and write it with a product from the flower. For example, on the concept of freedom

> Recognize a model of freedom for individuals among several types of government.

Next, go to the comprehension segment of the flower and choose another verb and product:

> Describe the pattern of freedom set by France for the colonies.

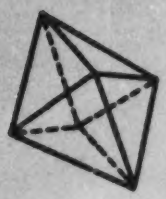
Continue moving around the center of the flower in a clockwise direction to generate activities at each of the six levels.

Application: Apply the concept of a democracy to the New Guinea situation.

Analysis: Compare two or more of the systems of government of countries which guarantee personal freedom to their citizens.

Synthesis: Describe an ideal government for insuring the freedom of children.

Evaluation: Evaluate 18th century England in terms of the freedom of children.



Task 4.3

Using "Blooming with Bloom", complete an activity for each of the cognitive levels on your concept.

Knowledge: Identify.....

Comprehension: Paraphrase.....

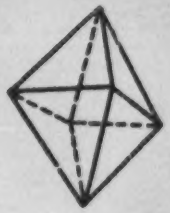
Application: Use.....

Analysis: Compare.....

Synthesis: Change.....

Evaluation: Judge.....

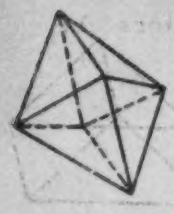
If you have decided to use this system for generating activities, proceed to the Terminal Task Worksheet at the end of this module.



Matrices

T_b The teacher will be able to use the matrix system to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

- E_1 The teacher will recognize the parts of the concept/cognitive behavior matrix as a result of reading a description of the matrix. (Knowledge)
- E_2 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)
- E_3 The teacher will recognize the parts of the synthesis matrix as a result of reading a description of the matrix. (Knowledge)
- E_4 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)



T_b The teacher will be able to use the matrix system to write activities on six cognitive levels as demonstrated by writing one (1) activity on each cognitive level for a concept. (Application)

Rationale

The concept/cognitive behavior matrix has two dimensions which form a grid. Within the grid it is possible to generate six activities, one at each cognitive level for each concept. The matrix system sets up forced relationships between the concepts and the cognitive behaviors.

The synthesis matrix was developed because synthesis activities are probably the most valuable for gifted students and generally the most difficult to generate. The cognitive behavior of synthesis is often confused with application. The differences between the two as elaborated on in Module 2, is that synthesis involves some change. One dimension of the synthesis matrix, therefore, has different ways to change formation.

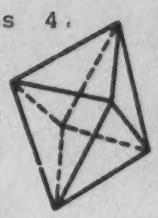
E_1 The teacher will recognize the parts of the concept/cognitive behavior matrix as a result of reading a description of the matrix. (Knowledge)

The vertical axis of this matrix is for the concepts that have been identified on your topic. The horizontal axis is for the cognitive behaviors according to Bloom.

Cognitive Behaviors

Concepts	Know.	Comp.	Appl.	Anal.	Syn.	Eval.
1.						
2.						
3.						
4.						
5.						

The intersection of any of the components of the two dimensions should result in an activity at a particular cognitive level on a particular concept.



A slight modification of this system is a full page matrix with only one concept. This allows more room for generating multiple activities at each cognitive level.

Cognitive Behaviors

Concept	Know.	Comp.	Appl.	Anal.	Syn.	Eval.

Task 4.4

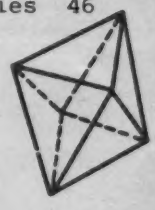
Label the blank matrix with the appropriate information, using the concepts for your topic. (page 45)

Activity 4.4 Concept/Cognitive Behavior Matrix

Topic: _____

Cognitive Behaviors

Concepts						



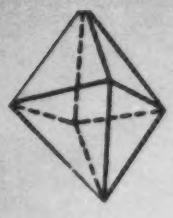
E_2 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)

The examples in this section will focus on the higher level cognitive behaviors of analysis, synthesis, and evaluation.

Topic: Democracy

Cognitive Behavior

Concepts	Analysis	Synthesis	Evaluation
Freedom	1. Compare the personal freedom of the individual in a democracy and under another form of government.	1. Improve upon the Bill of Rights. Write a new one.	1. Evaluate the importance of personal freedom to the concept of a democracy.
	2. Analyze the constitution to determine the rights of children.	2. Imagine a country in which the individual has no personal freedom. Write a short story to describe how the government would enforce its policies and how people would react.	2. Debate the issue of the rights of the unborn.
	3. Analyze the effect of individual personal freedon on the economy of a country.		



Task 4.5

Add five activities to the partially completed matrix on Democracy. You may add a concept or continue to create activities on the concept of freedom.

E_3 The teacher will recognize the parts of the synthesis matrix as a result of reading a description of the matrix. (Knowledge)

The synthesis matrix is made up of the two dimensions of change strategies and ways of communicating. Given a concept, at least six synthesis activities may be generated using the change strategies. (see page 48)

Concept:_____

Change Strategies

Ways of Communicating	Attribute	Perspective	Use	Value	Effect	History
Write						
Draw						
Build						
Dramatize						

A slightly modified version of the synthesis matrix lists concepts on the vertical axis instead of ways of communicating. (see page 49)

Task 4.6

Label the blank matrix you wish to use with the appropriate information using a concept(s) for your topic

Concept: _____

Change Strategies

Ways of Communicating							

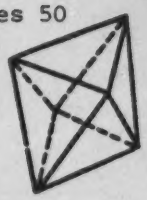
Activity 4.6 Synthesis Matrix

Activities 48

Topic: _____

Change Strategies

oncepts



E_4 The teacher will complete five cells of a partially completed matrix as a result of reviewing examples. (Comprehension)

To formulate activities using the snythesis matrix, focus on a concept and one of the change strategies. For example, using the concept of freedom, the attribute of political independence may be changed to yield an activity:

> Elaborate on the idea that an individual is dependent on the government which grants him political independence.

The next step is to choose a way of communicating this idea (from the vertical axis on the matrix).

> Write a short story about this paradox,

Other examples are given below:

> Change Persepctive: Advocate a freedomless society in an expository speech.
>
> Change Use: Draw up a constitution based on the premiss that the needs of the society are more important than the freedom of individuals.
>
> Change View: Dramatize the quality of life of the individual in a society which granted no personal freedom.
>
> Change Effect: Individual freedon results in free enterprise. If there were no laws governing free enterprise (limiting their freedom), what might result. Represent your conclusion in a schematization.
>
> Change History: Draft a Declaration of Independence as if there had been no French Revolution.

Task 4.7

Write five more synthesis activities using the matrix on the concept of freedom or another concept under the topic of democracy. Use five different change strategies.

Concept:

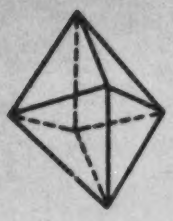
Change Strategy:

Activity:

Concept:

Change Strategy:

Activity:



Activities 51

Concept:

Change Strategy:

Activity:

Concept:

Change Strategy:

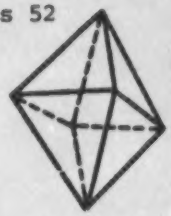
Activity:

Concept:

Change Strategy:

Activity:

If you have decided to use the matrix for generating activities, return to the worksheets for activities 4.4 and 4.6. (pages 45 and 48-49) Complete the matrix on page 45 for the concepts for your topic. Then, proceed to the Terminal Task Worksheet at the end of the module. As long as your matrix is complete there is no need for you to transfer the information to this worksheet.

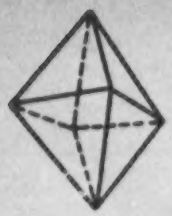


Williams' Strategies

T_C The teacher will be able to use the Williams' Strategies to write activities on six cognitive levels as demonstrated by writing six (6) activities for each concept. (Application)

E_1 The teacher will describe the steps in his own words for using the Williams' Strategies for generating activities as a result of reading a description of the steps. (Comprehension)

E_2 The teacher will use Williams' Strategies to finish several activities for a concept as a result of reviewing several examples. (Comprehension)



T_c The teacher will be able to use the Williams' Strategies to write activities on six cognitive levels as demonstrated by writing six (6) activities for each concept. (Application)

Rationale

Williams has presented 18 teaching strategies in his book Classroom Ideas for Encouraging Thinking and Feeling (1970, D.O.K.). The strategies focus on the unusual, puzzling, or exceptional about a concept.

Thinking in terms of these strategies when developing activities usually helps to generate higher level thinking activities.

E_1 The teacher will describe in his own words the steps for using the Williams' Strategies for generating activities as a result of reading a description of the steps. (Comprehension)

Williams' 18 strategies are listed and defined on the following pages. Three activities can be generated for each one based on Bloom's Taxonomy.

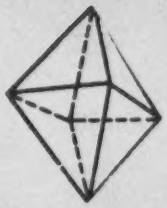
1. Identify and define the element. (Knowledge, Comprehension)

2. Recognize and locate examples of the element. (Application, Evaluation)

3. Analyze the element for the purpose of invention. (Analysis, Synthesis)

These three steps represent the developmental sequence to be used when teaching with each strategy. Activities generated on steps two and three would help to satisfy the needs of the gifted student for higher level thinking.

Williams' 18 strategies are given and defined on page 55. An example of creative activities for a science fiction unit follow the definitions on page 56. Each strategy takes a unique perspective on the content. Before the student can respond to that he must be able to identify it and locate examples. Following this acquisition of information, he may manipulate it at higher cognitive levels. The examples on science fiction are all from step 3 above.



Task 4.8

Describe the three steps for generating activities using Williams. Try not to refer back to the description - this is a comprehension level task.

Step 1:

Cognitive Behaviors

Step 2:

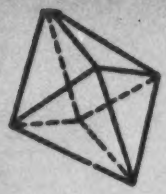
Cognitive Behaviors

Step 3:

Cognitive Behaviors

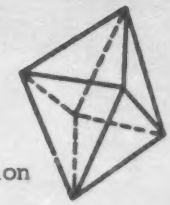
E_2 The teacher will use Williams' strategies to finish several activities for a concept as a result of reviewing several examples. (Comprehension)

Using the concept of freedom, we have given examples of activities throughout a chart on pages 58 and 59. Fill in five more activities, making certain you lend variety to the task by writing at least one activity in each column.



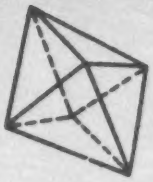
Williams' 18 Strategies

1. Paradox	Something which seems to be contradictory that may nonetheless be true.
2. Attributes	The inherent properties, characteristics or qualities.
3. Analogies	The comparison of two things based on some criteria of likeness or difference.
4. Discrepancies	Unknown, missing, or unreported information.
5. Provocative Questions	Inquiring about the puzzling, controversial, or mysterious.
6. Examples of Change	A focus on the dynamics or growth of a situation and the subsequent modifications.
7. Examples of Habit	A focus on the rigidity of thinking and the effects of it.
8. Organized Random Search	Using a familiar idea (like alphabetical order) to go at random to create a new idea.
9. Skills of Search	Searching for information through research in the areas of: Historical - search for ways something has been done before. Descriptive - search for the current status of something. Experimental - search for what happens in an experimental situation.
10. Tolerance for Ambiguity	Posing situations which are open-ended and do not force closure such as situations which puzzle, intrigue, or challenge thinking.
11. Intuitive Experience	Sensitive to information from the five senses, emotions and inward hunches.
12. Adjustment to Development	Learning and developing from mistakes or failures; generating many options for action.
13. Creative People and Process	Examining the traits and processes of creative people in a field of endeavor.
14. Evaluate Situations	Check ideas against the facts; make decisions based on consequences or implications.
15. Creative Reading Skill	Using reading as a springboard, a way to generate ideas.
16. Creative Listening Skill	Using listening to learn and generate ideas.
17. Creative Writing Skill	The skill of communicating ideas in writing and generating new ideas through writing.
18. Visualization	Express ideas in visual form and learning from visuals.

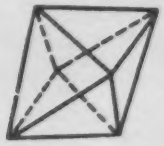


Higher Level Thinking Activities for a Science Fiction Unit based on Williams' Strategies

1.	Paradoxes	Propose a hypothesis to explain why it is that science fiction writers are able to accurately predict new inventions but not create them.
2.	Attributes	Analyze at least a dozen works classified as science fiction to determine its characteristics as a literary genre.
3.	Analogies	Analyze "science" and "science fiction" to determine their relationship. Analyze "fiction" and "science fiction" to determine their relationship.
4.	Discrepancies	Identify something which is unknown in a science fiction work: write a science fiction story in which that unknown is known.
5.	Provocative Questions	Propose an hypothesis to answer the question: "Why has science fiction been called a modern mythology?" Predict the effect of a science fiction "fact" suddenly becoming real.
6.	Examples of Change	Create a science fiction story pretending that you, the author, are living in the 1800's.
7.	Examples of Habit	Evaluate a science fiction work in terms of all the ways it contradicts our habitual ways of viewing things.
8.	Organized Random Search	Create a science fiction story in which you change the sex of the main character.
9.	Skills of Search	Summarize the history of science fiction.
10.	Tolerance for Ambiguity	Propose alternative hypotheses for solving Princess Lea's problem in "Star Wars". (Teacher may read any science fiction story outloud and stop at a crucial point for several days to allow students to propose solutions to a dilemma.)
11.	Intuitive Experience	Re-write a story including yourself as a character.



12.	Adjustment to Development	Propose questions to be able to describe a mysterious character, object, or situation. Propose hypothesis based on information available (twenty questions).
13.	Creative People and Process	Analyze Isaac Asimov's life to describe his dual careers as science fiction writer, and scientist.
14.	Evaluate Situations	Investigate the effect of science fiction on the scientific community.
15.	Creative Reading	Compare two science fiction works written 100 years apart.
16.	Creative Listening	Create sounds for several machines or weapons used in a science fiction work.
17.	Creative Writing	Write a story 100 years hence using one of the two themes analyzed in objective #15.
18.	Visualization	Create illustrations for one of your original science fiction works.



Activity 4.9 - Activities Based on Williams Strategies
Concept: *Freedom*

Strategy	Identify, Define	Find Examples	Create
Paradox		*If freedom is the natural state of humans, why do some tolerate not being free?*	
Attributes			
Analogies		*A doctor is to medicine as _____ is to freedom.*	
Discrepancies	*"Free" means unrestricted. Freedom is restricted by the rights of others. Explain.*	*Right to lifestyle. How is it restricted? How is it related to personal freedom in a free society?*	*Describe a society which gives unrestricted freedom to individuals.*
Provocative Questions			
Example of Change	*The Bill of Rights has grown. Why? How?*		
Example of Habit	*People take their freedom for granted. How? Why?*	*Have we lost some freedoms through neglect?*	*What freedoms would you want first if you had never been free? Why?*
Organized Random Search			
Skills of Search	*New democracies are experimenting with our model. What countries have? With what result?*		
Tolerance for Ambiguity			

Activity 4.9 - Continued

Strategy	Identify, Define	Find Examples	Create
Intuitive Experience			You have just been ma a slave. Describe ho you feel.
Adjustment to Development		How has big government affected the freedom of the individual?	
Creative People and Process	Thomas Jefferson Who was he? Why is he identified with freedom?		
Evaluate Situations			What will be the stat of personal freedom on earth in the year 2200?
Creative Reading Skill	Historical Fiction What is it? Of what value is it? To whom?		
Creative Listening Skill		Freedon has been expressed in song and poetry. When? What are some examples?	
Creative Writing Skill		Thoreaus' treatis Civil Disobedienc a classic expressio of personal freedom. Why? Find another example.	
Visualization Skill	Symbols of freedom What are they? Where did they originate?		

If you have decided to use this system for generating activities, use the additional chart provided on page 61 to write activities. It may not be possible or even useful to generate 54 activities. Instead, choose one technique for each concept and write at least three activities for it.

After completing the chart with at least 12 activities, proceed to the Terminal Task Worksheet at the end of this module. It is not necessary to rewrite your activities in this format if they are organized by concept.

Activity 4.9 - Activities Based on Williams Strategies Concept:

Strategy	Identify, Define (Concept)	Find Examples	Create
Paradox			
Attributes			
Analogies			
Discrepancies			
Provocative Questions			
Example of Change			
Examples of Habit			
Organized Random Search			
Skills of Search			
Tolerance for Ambiguity			
Intuitive Experience			
Adjustment to Development			
Creative People and Process			

Activity 4.9 - Continued

Strategy	Identify, Define	Find Examples	Create
Evaluate Situations			
Creative Reading Skill			
Creative Listening Skill			
Creative Writing Skill			
Visualization Skill			

Terminal Task Module 4

Complete the following information to meet the requirements of the Module:

Topic _____

Concepts

A.

Activities

1.

2.

3.

4.

5.

6.

B.

1.

2.

3.

4.

5.

6.

C.

1.

2.

3.

4.

5.

6.

D.

1.

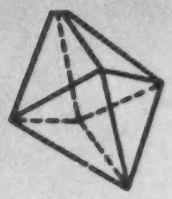
2.

3.

4.

5.

6.



E.

1.

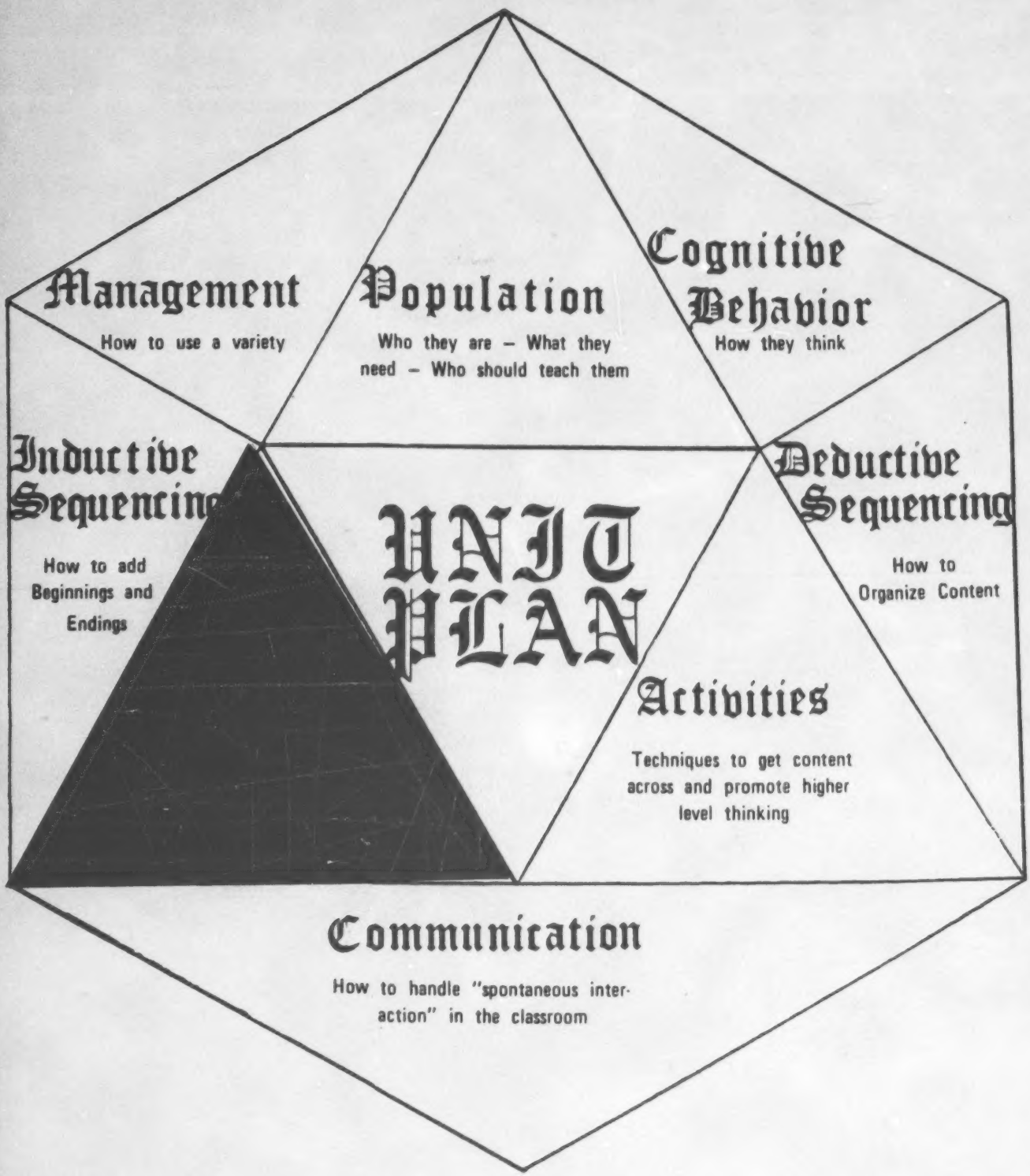
2.

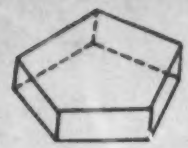
3.

4.

5.

6.


Management
How to use a variety
Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
UNIT PLAN
Deductive Sequencing
How to Organize Content
Activities
Techniques to get content across and promote higher level thinking
Communication
How to handle "spontaneous interaction" in the classroom



Module 5

Terminal and Enabling Objectives

T_1 The teacher will be able to write terminal objectives that include a defined population, a cognitive behavior, and method of evaluation. (Application)

T_2 The teacher will be able to write enabling objectives that include a defined population, a cognitive behavior, and activities designed to develop those behaviors. (Application)

E_1 The teacher will be able to recognize the four independent behavioral objectives as a result of studying definitions and practicing discriminating among those parts. (Comprehension)

E_2 The teacher will be able to discriminate between terminal and enabling objectives as a result of recognizing which parts of behavioral objectives are included in terminal objectives and which parts are included in enabling objectives. (Evaluation)

Objectives

Terminal Enabling

Evaluation Cog. Beh. Pop. Activity

T_1 The teacher will be able to write terminal objectives that include a cognitive behavior and method of evaluation.

T_2 The teacher will be able to write enabling objectives that include cognitive behaviors and activities designed to develop those behaviors.

Rationale

At this point in the instructional program you have selected a topic, written a rationale, identified cognitive behaviors, arranged cognitive behaviors in a deductive sequence, and identified a minimum of 18 instructional activities. You are now ready to complete your basic unit plan by combining these components into a system of terminal and enabling objectives. Your unit plan will specify terminal behaviors to be achieved by gifted students along with suitable evaluative conditions and, enabling objectives designed to move students along a continuum toward these desired end of unit behaviors. The enabling objectives will be the activities you have already written, organized from simple to complex in terms of cognitive behavior and content. The terminal objective will describe the final student outcome of the entire unit of study. For gifted students it will probably represent a problem and require synthesis level cognitive behavior.

You have no doubt noted that you, the gifted teacher, are expected to complete the higher cognitive level task of writing a unit as a result of this program. Each Gem provides you with opportunities to complete a part of that task. The activities within them "enable" you to complete the terminal objective.

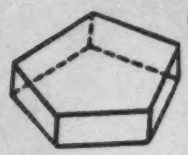
E_1 The teacher will be able to recognize the four independent parts of an objective and have then gone on to make some vague distinctions between goals and objectives. This has resulted in little substantive differences between goals and objectives and the distinction has served no useful purpose. We attempt to avoid the confusion created in this structure by focusing on terminal and enabling objectives. Functional rules for terminal and enabling objectives can be defined and clear distinctions between them can be drawn. First, the four parts required in the formation of objectives include:

1. Population - who will demonstrate the behavior specified in the objective.

2. Behavior - a word or phrase that clearly describes the behavior to be acquired by the population. (See Module 2 on Cognitive Behavior)

3. Activity - a description of the activity(ies) that will produce the desired behavior. (See Module 3 on Deductive Sequencing and Module 4 on Activities)

4. Evaluation - how will the desired behavior be evaluated and what level of mastery will determine successful performances. (See Module 4 on Activities)



Example

Intellectually gifted 4th grade students - population (p)

Will write a minimum of five hypothesis - behavior (b)

After examining alternative causes for hypthetical events presented in short paragraphs - activity (a)

Each hypothesis will meet the two standards of: - evaluation (e)

a. accounting for data presented in the event description
b. testability

Task 5.1

Identify the following parts of objectives as referring to the population (p), behavior (b), activities (a), or evaluation (e).

Objective 1. ___(a) Intellectually gifted 5th grade students
___(b) will construct two dimensional shapes
___(c) by following sets of written directions.

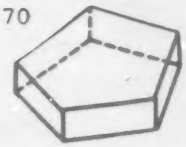
Objective 2. ___(a) Creatively gifted 1st grade students
___(b) will identify humorous events
___(c) observed in their own homes over a two-day period.

Objective 3. ___(a) Intellectually gifted 6th grade students
___(b) will describe Buck's early environment and
___development (c) during a class discussion following silent reading of Chapter 1 in "Call of the Wild."

Objective 4. ___(a) Intellectually gifted 5th grade students
___(b) will demonstrate an ability to compare
___geometric forms (c) by constructing a two dimensional matrix that illustrates the relationships between number of angles and number of sides of a minimum of five shapes.

Objective 5. ___(a) Intellectually gifted 6th grade students
___(b) will be able to state in their own words
___the law of the "Club and the Fang" (c) so that the statement is recognizable to peers.

Objective 6. ___(a) Creatively gifted 3rd grade students (b) will
___demonstrate an ability to generate (c) a minimum
___of six alternative hypothesis explaining why each of several events has occurred when given verbal descriptions of unusual events.



E_2 The teacher will be able to discriminate between terminal and enabling objectives as a result of recognizing which components of objectives are included in each.

Enabling objectives contain the following components:

1. Population
2. Behavior
3. Activity

Enabling objectives focus on the activities students will engage in as they work in the unit of study. Several similar, optional, and/or alternative activities may be listed under one enabling stem, that is, one statement of population and cognitive behavior. Enabling objectives are characterized by the word "will." The student "will" do something to gain the information or skills he needs in working toward the completion of the terminal objective.

Intellectually gifted 4th grade students will compare attributes of trees by:

1. Examining diagrams of trees,
2. Examining trees on school grounds.
3. Participating in a brainstorming session, and
4. Discussing with classmates commonalities and differences of trees.

Terminal objectives contain the components:

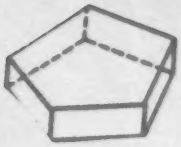
1. Population
2. Behavior
3. Evaluation

Terminal objectives are distinguished by a "will be able to" or "will demonstrate" phrase and criteria for judging successful performance of the cognitive behavior specific within the objective. Conditions selected for demonstrating final performance may be drawn from the pool of activities developed in Module 4. Someone looking at a terminal objective should be able to asnwer the question, "How will I know when I have successfully demonstrated the cognitive behavior stated in the objective?" You may ask yourself, "How will I distinguish between successful and unsuccessful performance?"

Examples

Enabling

1. Creatively gifted 3rd grade students will list alternative modifications for a broom by using an attributes checklist.
2. Intellectually gifted 5th grade students will record critical incidents contributing to changes in their environment observed over a two-week period of time.



Terminal

1. Creatively gifted 2nd grade students will demonstrate the ability to produce flexible responses to pictorial stimuli with a minimum of five categorically different responses per picture.
2. Intellectually gifted 6th grade students will demonstrate an ability to contrast two literary selections by isolating a minimum of five contrasting elements for each of three pairs of selections.

Task 5.2

Return to task 3.2 and classify the objectives you wrote as either enabling or terminal. Look for the characteristic phrasing of "will do" (enabling) and "will be able to." Do you use other synonyms for these phrases? What are they?

Terminal Task - At this point, you should be able to organize the cognitive behaviors you have selected, activities, and knowledge of terminal and enabling objectives in a complete unit plan. At this point your unit plan will contain a rationale, terminal objectives in which evaluation conditions for demonstrating terminal behaviors are specified and enabling objectives that delineate cognitive behaviors and activities. These terminal and enabling objectives should be hierarchically arranged in a deductive sequence consistent with the taxonomy of cognitive behaviors and levels of learning in content.

Your unit should meet the following criteria:

1. Rationale - as specified in Module 1

2. Terminal Objectives
   a. Population
   b. Observable cognitive behavior
   c. Evaluative criteria

3. Enabling Objectives
   a. Population
   b. Observable cognitive behavior
   c. Activities

4. A sequence of enabling objectives that will lead students through the prerequisite lower level cognitive behaviors and levels of learning to the desired terminal objective.

5. A preponderence of higher level cognitive behaviors.

6. Each objective labeled with the cognitive level behavior.

Answer Key

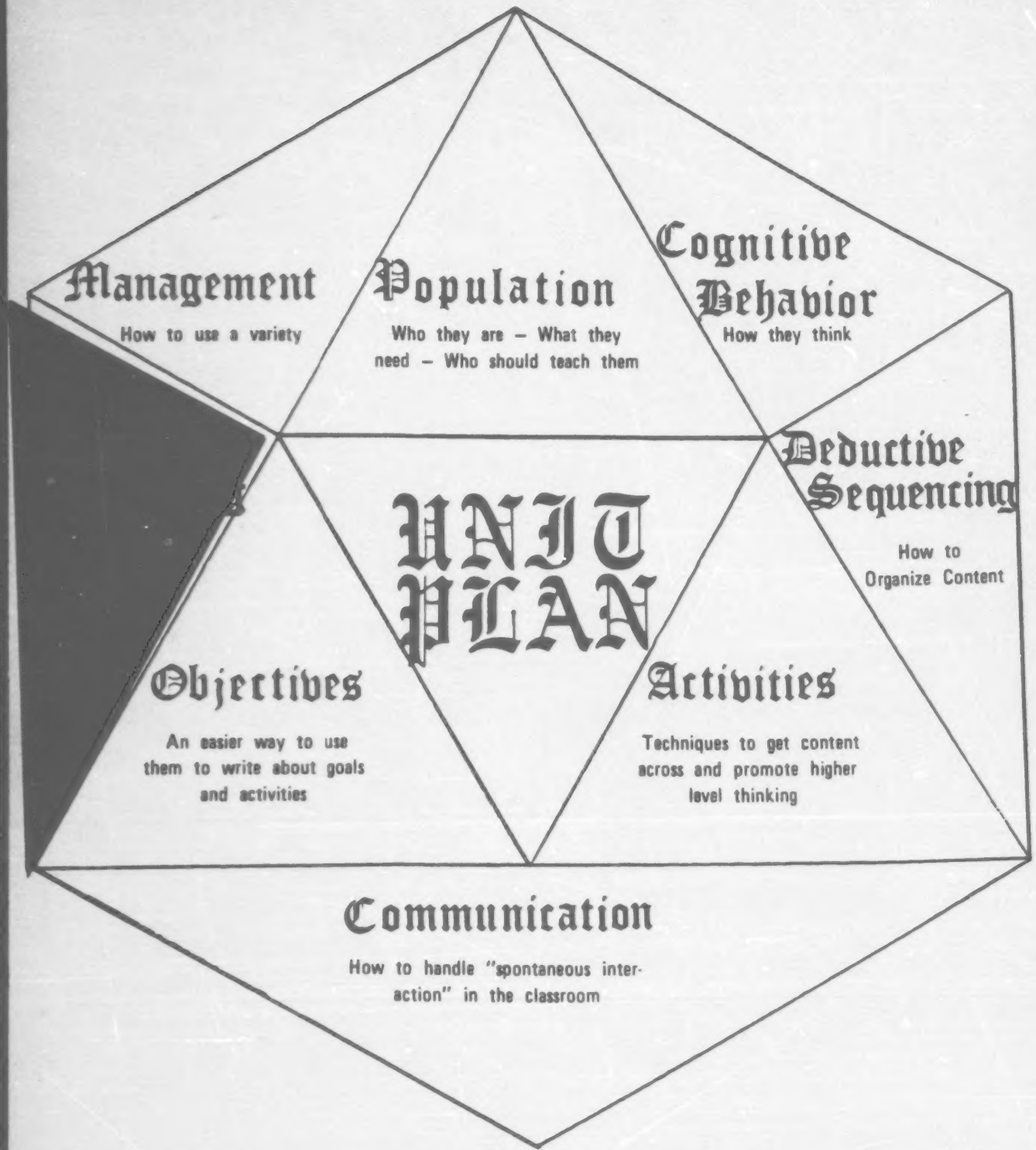
Task 5.1

Obj. 1	Obj. 2	Obj. 3
a. Population	a. Population	a. Population
b. Behavior	b. Behavior	b. Behavior
c. Activity	c. Activity	c. Activity

Obj. 4	Obj. 5	Obj. 6
a. Population	a. Population	a. Population
b. Behavior	b. Behavior	b. Behavior
c. Evaluation	c. Evaluation	c. Evaluation

Task 5.2

Obj. 1	E
Obj. 2	E
Obj. 3	E
Obj. 4	T
Obj. 5	T
Obj. 6	T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How they think
Deductive Sequencing
How to Organize Content
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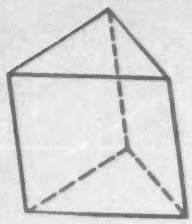


Module 6

Inductive Sequences of Learning Activities

T The teacher will be able to construct a unit presentation using the inductive approach as demonstrated by the addition of introductory and culminating activities to his unit plan. (Application)

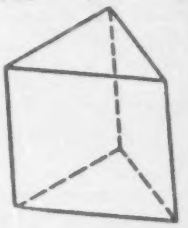
E_1 The teacher will describe the inductive approach to sequencing learning activities as a result of reading a description of it. (Comprehension)

E_2 The teacher will develop an introductory activity as a result of completing T_a or T_b:

T_a The teacher will be able to describe a minimum of three learning activities designed to teach problem solving strategies for Type 3 and Type 4 problems as measured by the definition of an introductory activity in the inductive approach.

T_b The teacher will be able to write ontological, axiological and epistemological questions and activities for use as an introduction to a topic and which meet the criteria of an introductory activity. (Application)

E_3 The teacher will develop culminating activities for a unit as a result of reading a description of problem solving and examples of activities. (Application)



T The teacher will be able to construct a unit presentation using the inductive approach as demonstrated by the addition of introductory and culminating activities to his unit plan. (Application)

Rationale

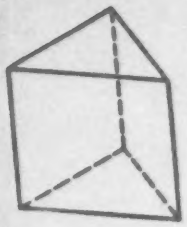
There are two basic approaches to organizing learning activities for students. One follows a deductive approach (Module 3) in which prerequisite behaviors are carefully established as students are led up through both Bloom's taxonomy in the cognitive domain and Gagne's levels of learning. This approach utilizes a sequential organization of enabling objectives that lead to terminal behaviors. Knowledge and comprehension level behaviors are established prior to application type behaviors followed by analysis, synthesis and evaluation level behaviors. Multiple discriminations and concept acquisition are established prior to principle and problem solving level tasks.

The other approach utilizes an inductive approach in which students are immediately immersed in higher level tasks and then find (discover) it necessary to backtrack through lover level behaviors in order to resolve apparent paradoxes and ambiguities. Each approach has its strengths and weaknesses depending upon teacher preference, content area, and student grade level and sophistication.

The purpose of examining the inductive approach is to produce an introductory and culminating activity for your unit. Although the body of your unit is complete with its activities and expectations, we have made no mention of its presentation to students. The inductive approach provides the key to the successful implementation of a well-prepared unit.

The introductory activity is designed to interest students in the topic and to provide or initiate direction for information gathering. The intermediary activities guide this search for information so that the topic is thoroughly explored. The culminating activity then ties all that has preceded it together. It represents the best answer to the question posed by the introductory activity.

Topic	Introductory questions and activities	Culminating activities
Historical Fiction	How accurate is historical fiction? Students listen to tape recording of Hal Holbrook's Truman, and read an historical rendition.	Students "become" an historical figure, thereby creating historical fiction.
Fractions	How many different ways can you tell someone you want a part of something? In groups of five students receive a large candy bar. They are asked to write what part they want of it on a piece of paper using any expression except fractional ones. The student with the most unusual and accurate request (as judged by another group) gets that part. The rest of the candy bar is divided among the others.	



E_1 The teacher will describe the inductive approach to sequencing learning activities as a result of reading a description of it. (Comprehension)

The inductive approach to a unit consists of three stages:

Stage 1. Introductory activities which present a question or problem, and then clarify it.
Stage 2. Intermediary activities which are built around a terminal objective and several enabling objectives.
Stage 3. Culminating activities which bring all the information of the unit to bear on solving the problem or answering the question posed at the beginning of the unit. Idea-finding and solution finding contribute to this stage.

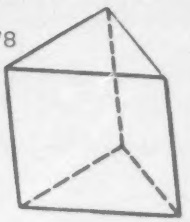
How to write introductory activities is the topic of the next enabling objective (E_2). Introductory activities may be based on a problem (T_a) or a philosophical question (T_b). The problem solving process of problem clarification, idea-finding and solution-finding are presented in the section on culminating activities (E_3). You have already written the intermediary activities for the unit if you completed module 4.

Task 6.1 Describe the three stages of the inductive approach in your own words. Try not to refer to the description given.

Stage 1.

Stage 2.

Stage 3.



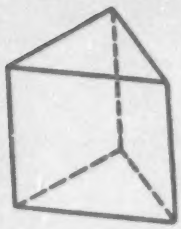
E_2 The teacher will develop an introductory activity as a result of completing the terminal objective for problem solving or philosophical perspective.

The basic premise of the inductive approach is that students are more motivated to learn about a topic if they are presented with something which puzzles them. Like a rhetorical question, an introduction to a unit which has an unknown answer, can get students involved through presenting them with a challenge. Added to a unit of study, this is the introductory activity.

The section on problem solving discusses four types of problems, two of which are appropriate for introductory activities for a unit for gifted students. The section on philosophy suggests a perspective which poses three unanswered questions on a topic.

At this point you whould read the rationales for each of the sections and then choose one to complete. Of course you may examine the sections as closely as you wish before making your decision.

After formulating an introductory problem or question, it should be added to your unit plan. In addition, you will want to be sure to make plans to make it a highly visible part of the students' environment, something on the order of a large banner at the front of the room.

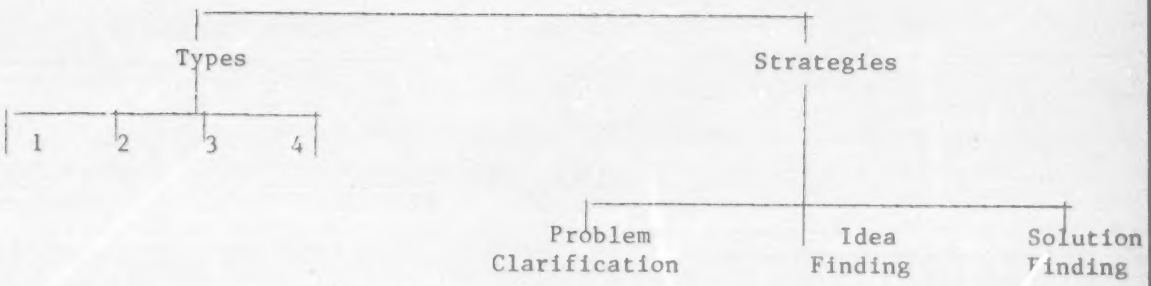


Problem Solving

T_B The teacher will be able to describe a minimum of three learning activities designed to teach problem solving strategies for Type 3 and Type 4 problems as measured by the definition of an introductory activity in the inductive approach. (Application)

E_1 The teacher will classify problems as a result of studying definitions and examining examples of problem types. (Comprehension)

Teaching
Problem Solving

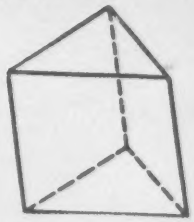


Rationale

The two tasks of problem finding and problem solving provide numerous opportunities for application of higher level cognitive behaviors. Because of their significance in the intellectually gifted classroom, it is desirable to examine them from a first person perspective as well as a process to be taught. It is assumed that teachers well-versed in efficient problem solving strategies will not only be better able to teach problem solving as a process, but will increase their effectiveness by serving as problem solving models.

Although problem solving can be taught to all levels of students, it is the intellectually gifted who, as future producers of information, will benefit most significantly from skills in this area. Problem solving is one of the distinguishing features of the intellectually gifted classroom and emphasis on problem finding and problem solving contribute significantly to the qualitatively differentiated curriculum.

Posing a Type 3 or Type 4 problem is an excellent way to begin a unit. They present the students with "real" problems to be solved.



E_1 The teacher will classify problems as a result of studying definitions and examining examples of problem types. (Comprehension)

Clarification of higher level cognitive behaviors in problem solving is grounded in the problem finding - problem solving context presented by Getzels (1975). Problem classification, according to Getzels, is based on who has information about different stages of the problem solving process. The figure below, adapted from the work of Getzels and extended to include one new type of problem, presents a problem classification scheme based on the amount of information possessed by teachers and students for each of three primary stages in the problem solving process.

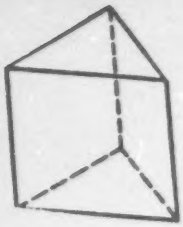
Problem Finding - Problem Solving

Problem Types	Problem Statement		Idea Finding		Solution Finding	
	Tch.	St.	Tch.	St.	Tch.	St.
1	+	+	+	+	+	-
2	+	+	+	-	+	-
3	+	+	+	+	-	-
4	-	-	-	-	-	-

As pointed out by Getzels, the only mystery in Type 1 problems is the correct answer to be supplied by students. Actually, Type 1 problems require only the low level thinking skills of knowledge and comprehension. Type 1 problems are frequently encountered in commercial text and workbook series and can be identified by a basic fill in the blank format. Type 1 problems present the problem statement for which some standard method of solution is already known to students. For example, "Side A of a square is 5 inches, find its area." The method of solving this problem has already been established and students are required only to recall a formula, substitute one number in the correct place, and to perform one arithmetic operation in order to arrive at the correct solution.

Type 2 problems require the student to find a method of solving the problem as well as determining its correct solution. For example, "Side A of a square is 5 inches. How do you suppose you can find its area?" Type 2 problems are utilized in discovery learning processes in which students are expected to explore several alternative methods for arriving at a correct solution. Students then evaluate various alternatives and select the most efficient method. What frequently happens in group settings, however, is that one student discovers a solution which is confirmed by the teacher, and the rest of the group then has only a Type 1 problem to solve.

A third type of problem offers a defined problem statement to both teacher and student for which one general methodology is employed. The solution for Type 3 problems is however, open-ended. Any solution

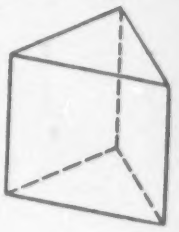


that can be supported either directly or by inference is considered. Type 3 problems are generally encountered in such settings as moral reasoning sessions (Galbraith & Jones, 1976) where moral dilemmas establish the problem setting; Great Books program where interpretations of authors' intent are used to establish problem conditions; and in Lipman's (1974) Philosophy Program for Children. Solutions are judged neither right or wrong, but rather in terms of probabilities based on the supportive evidence gathered from contextual clues. The method employed in Type 3 problems is based on analysis of the problem setting mediated by values and/or feelings held by the problem solver. The significance of various pieces of information may vary based on each individuals mediating function and a variety of correct solutions may emerge.

Type 4 problems are unstructured situations in which neither teacher or student has defined the problem. Obviously, in this state of ambiguity, there can be "neither a predetermined method or predetermined solution." For example, "Here is a square, how many different questions can you ask about it?" or "How many ways can you divide eighteen in half?" Type 4 problems are often stated as tasks to be accomplished or offered as settings in which something is likely to change. For example, "Build", "Find", "Defend your position", "How will life be different 20 years from now?", or "If snow were green....." introduce opportunities for defining and solving Type 4 problems.

Both Type 1 and Type 2 problems have predetermined methodologies and one correct, predetermined solution. Students need apply only the cognitive behaviors of recall and comprehension in finding the correct solution to Type 1 problems. In Type 2 problems, students must "discover" a method and then find the solution. Although analysis, comprehension, and application behaviors may all occur in Type 2 problems, it is questionable whether a large number of students actually engage in all of these cognitive behaviors in a group setting. Type 3 problems require analysis of some problem condition, generation of plausible solutions based on evidence available in the problem setting, and then organization of evidence to support selection of one solution. Not only are synthesis behaviors required in generating plausible solutions but evaluation behaviors are required in assessing the degree to which selected evidence actually supports the conclusion. Type 3 problems generally structure the method of solution around formal reasoning processes.

Type 4 problems require students to first clarify the problem and then find both a method and a solution for solving the problem. This process may lead to a whole set of questions to be explored individually or by small groups of students. Type 4 problems offer substantial opportunity for developing problem finding and problem clarification skills requiring the use of analysis level behaviors. Type 4 problems also require synthesizing behaviors, i.e., the construction of a method of alternative methods leading toward a solution; and finally evaluation, i.e. determining which alternative method is most efficient and whether or not the solution satisfies conditions defined in the problem. The qualitatively different program for gifted students will contain a preponderence of Type 3 and Type 4 problems.



Examples of Type 3 problems that might be built into existing curricula are:

1. Which character in this story do you think is strongest? Why? How do you define strength?
2. What would you have done in John's position? Why?
3. Why do you think Harry Stottlemier behaved like that?

Although Type 3 problems are now generally found in some very excellently structured programs, their use should increase and generalize to the standard curriculum as experience with these programs continues.

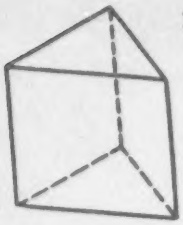
Examples of Type 4 problems that might be included in any curricular programs are established in such directions as:

1. Reproduce a natural environment in your classroom.
2. Develop a system for measuring small objects.
3. Develop a plan for organizing a student government.
4. Find out how people are manipulated in our environment.
5. Find at least two ways to measure a tin can.
6. Develop a non-verbal process for comminicating directions in the classroom.

Each activity is basically open-ended and requires that the student extablish his own starting point, that is, state the problem or define the question. Once a basic question is defined, the student may go on to invent a methodology (idea finding) and eventually arrive at a solution. The solution is not judged in terms of its correctness from any normative standard but rather, is judged on how well it responds to the original question. Type 3 and Type 4 problems provide inductive opportunities for learning. That is, they provide overall structures within which investigation of topics and gaining of both knowledge and skills may occur.

Examples - presented below are examples of several problems classified by type.

	Problem	Type
1.	Go outside and count something you know more about after you have counted it than you did before you counted it.	4
2.	How is a parable different from other literary forms?	3
3.	Given two alternatives, which do you think John should choose?	3
4.	If John has 30 apples and he gives 12 to Mary, how many apples does John have left?	1



5. If a bullet weighs 6 gms. and has a muzzle velocity of 1,250 ft./second, how high can the bullet travel if directed in a line congruent with our earth radii? 1

6. How could you locate points in two-dimensional space? 2

7. Collect information from your classmates about their favorite color. 4

8. Which character in this story is the most frivolous? 3

Task 6.2 - Classify each of the following problems as a Type 1, 2, 3 or 4 problem.

1. How do you suppose we can use a barometer to find the height of a skyscraper?

2. Map something that cannot be seen.

3. Find the area of a triangle with h=5" and b=4".

4. List at least four problems that the farmers of Latin America face.

5. Find out what people do that they say they don"t do.

6. If you were to change just the ending of this story to make it more interesting, how would you do it?

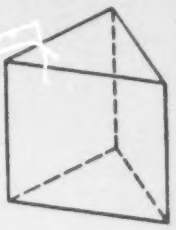
7. Identify the theme of the story beginning on page 26 of your basal reader.

8. How many different types of closed geometric figures can you construct with 5 or less straight lines?

Terminal Task

Suppose you were using a problem-solving approach in a heterogeneous-oriented classroom and wanted to explore the topic of energy conservation. You might begin by brainstorming the topic and encouraging individual students to identify specific problems related to the topic. (an introductory activity) They might then be encouraged to find alternative solutions. (intermediary activities) These problem clarifying and problem solution stages would then be followed by a verification stage in which students would be required to find and/or generate data related to their hypothesis. Finally, these solutions would be evaluated and compiled in a product. (culminating activity)

The process may be used with whole class groups, small groups and/or individuals. The distinguishing feature of the



approach is beginning with a Type 3 or Type 4 problem, clarifying the question, generating alternative hypotheses and then collecting data to verify or reject hypotheses. During the hypothesis verification stage, students will be applying a range of specific information-gathering and processing skills and may be introduced to new research tasks as needed.

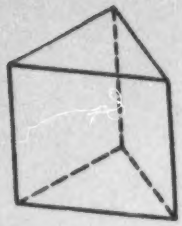
Task

1. What questions, for your grade level might you expect to come out of the energy topic?

2. What are some of the alternatives answers to these questions?

3. What activities would students engage in as they verified these hypotheses?

4. Write a Type 3 or Type 4 problem on your topic and describe how it could be used as an introductory activity.

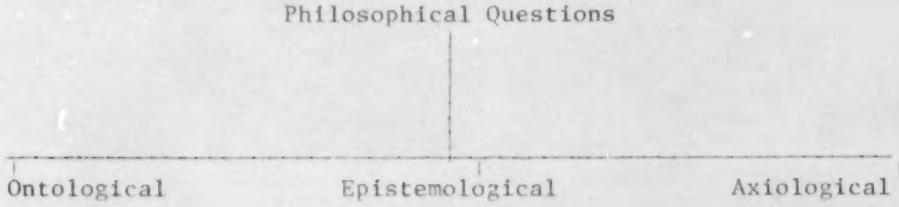


Philosophical Perspective

T The teacher will be able to write ontological, axiological, and epistemological questions and activities for use as an introduction to a topic and which meet the criteria of an intorductory activity. (Application)

E_1 The teacher will write ontological, axiological, and epistemological questions as a result of reading examples, and recognizing question stems for each type. (Application)

E_2 The teacher will describe how philosophical questions can be used in a unit of work as a result of reading a description of several alternatives. (Comprehension)

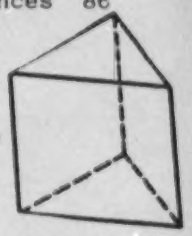


T The teacher will be able to write ontological, axiological, and epistemological questions which meet the criteria of definitions of those terms from Koorner (1969).

I. Rationale

There are at least three perspectives in confronting the information received through the senses: acquisitive perspective, critical perspective, philosophical perspective. The acquisitive perspective is the process of acquiring information, i.e. the sensory input is recognized, and understood. It may be stored in short or long-term memory. This acquisition of information does not require manipulating it. The other two perspectives, critical and philosophical, require processing of information. Critical thinking involves analysis and is thoroughly discussed in the module on Bloom.

The philosophical perspective questions the criteria upon which the critical perspective is based. It involves questioning how we know, what exists, and what is valued. These areas are formally called epistemology, ontology, and axiology, respectively. Gifted students have the ability and the inclination to think philosophically. An inductively sequenced unit for them can begin with philosophical questions.



E_1 The teacher will be able to write ontological, axiological, and epistemological questions as a result of reading examples, and recognizing question stems for each type. (Evaluation)

Axiology is the study of what is valued. Ethics, moral dilemmas, and values clarification all fall under axiology. In this area the formal goals are to describe the valuing experience of people, propose hypotheses about why certain value systems are held, and to compare valuing systems. Take gifted education, as a sample topic for axiological questions:

Is gifted education valued?
Who values gifted education?
Who doesn't value gifted education?
Why is it important to some people?
Why is it not important to others?
Is there a relationship between support for education in general and support for gifted education?

Axiological questions about parables follow the same pattern:

Is the parable valued by some group of people?
By whom? Why?
Do some people reject the parable as an important literary form? Why?
Are there some people who recognize the existence of the parable and yet deny its importance?
Who? Why?
Is there a relationship between literary taste and the valuing of parables?

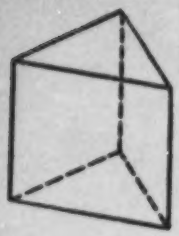
Questions of an axiological nature about measurement are:

Who is perimeter important to? Why?
What else do you suppose is valued by these individuals?
Why?
Is there a group of individuals who value perimeter and no other concepts in measurement? Why?

With experience, students can delve more and more deeply into questions of value. In order to answer a question of value it is necessary to use analysis, synthesis and evaluation. Students are directed to propose reasonable hypotheses to answer open-ended questions.

Axiological questions generally ask:

What is important?
To whom is it important?
How is it important?
Why is it important?



Task 6.3 - Identify the axiological questions by checking them:

_____1. Describe the geographic features of the area.
_____2. Why did the travelers choose to stop by the river?
_____3. What was valued most by the Mohawk Indians?
_____4. Who is land important to today?
_____5. Why did Cinderella take the abuse of her sisters and stepmother?
_____6. What did the prince in "The Prince and the Pauper" hope to achieve when he switched places with the Pauper?

Task 6.4 - Write four axiological questions.

1.
2.
3.
4.

Epistemology is the study of how we know. As an outgrowth of axiological questions, students may be asked how we know about a topic. In the formal study of epistemology several sources of kno ledge have been proposed. Some of the most familiar sources of knowledge are sensory input, reason, authority, and intuition. Other sources which have been proposed are instinct, racial memory, extra-sensory perception, supernatural revelation, spiritualism, occult, and anamnesis (deja vu). Epistemological questioning attempts to establish the reliability or accuracy of our information. Epistemological questions about gifted education might include the following:

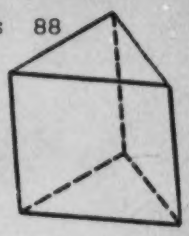
How do we know what gifted education is?
What is the definition of gifted? How do we know?
How can we test our definitions?
What does a program for gifted students include?
How do we know?

About parables, some epistemological questions are:

How do we know about parables?
When did we first know about them?
What do we know about parables?
Has a definition of parable been agreed upon?
Is it logical? Consistent? Accepted by everyone?

On the topic of measurement:

How do we know about measurement theory?
How was it developed? By whom?
Can we personally verify the concepts of triangle, square, and rectangle as defined by measurement theory? How?



Epistemological questions ask:

What do we know?
How do we know about it?
How do we know we know about it?
Is our knowledge complete?
Is it accurate?

Task 6.5 - Identify the epistemogical questions:

_____1. Should policemen be able to break the law to inforce it?

_____2. What do we know about gravity?

_____3. What is the definition of love?

_____4. Has science fiction been defined?

_____5. How do we know about the magnetic north?

_____6. Where is San Diego in relation to Los Angeles?

_____7. Can hate be defined?

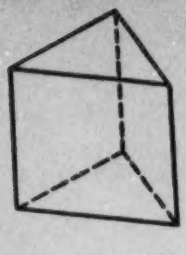
_____8. Is freedom a reality?

Task 6.6 - Write four epistemological questions.

1.
2.
3.
4.

Ontology is the study of the essence of existence of a concept. Ontology seeks to verify or deny the existence of a concept and to describe how it exists. It is closely linked to epistemology, so closely in fact, some people have questioned its existence as a meaningful area of inquiry. But ontology asks how something exists, not how we know it exists. It deals with the state of the condition of something's existence. Ontology also asks if the existence of something can be verified, or if, indeed, it has reality. The most familiar ontological question is, "Does God exist?" In the area of gifted education some ontological questions are:

Does gifted education as a unique type of education exist?
Can it be defined?
Does it exist in the learner, the curriculum, the teacher, or all three?
Does it exist by definition or naturally?



In the area of literature:

If parable is defined as presenting a "basic truth," what is the definition of a "basic truth"?
Are "basic truths" discovered or created?
Are parables unilaterally linked with some individuals or some time periods?
Are there more parables in some time periods than others?
Are parables a reflection of the state of society or vice versa?

In the area of measurement:

Did people discover triangles in nature or create them?
Are two-dimensional measurement concepts real?
Is "area" a meaningful concept in four dimensions?
Is "length" a meaningful concept without "width"?

Ontological questions ask:

Does it exist?
How does it exist?
What are the conditions of its existence?
When did it come into existence?
How did it come into existence?

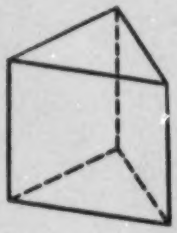
Task 6.7 - Identify the ontological questions in the following list:

_____1. Are governments natural or created by man?
_____2. Does education really occur?
_____3. What is the definition of existence?
_____4. Does an increase in leisure time reflect a decadent society?
_____5. Are concepts meaningful only in terms of their opposites?
_____6. Can success be absolutely defined?

Task 6.8 - Write four ontological questions:

1.
2.
3.
4.

Questions in the three areas tend to lead into each other rather naturally. For some students, acquisitive learning can take place within the philosophical perspective. Others, however, who skim the surface of the philosophical questions will need guidance into acquisitive learning in order to have a body of knowledge to operate from.



Task 6.9 - Identify the following questions as axiological (A), epistemological (E), or ontological (O):

Topic: Nude Bathing

_____1. Why is nude bathing important to some poeple?
_____2. What is the definition of nude bathing?
_____3. Is nude bathing acceptable in some places?
_____4. Has nude bathing always occurred?
_____5. What do we know about nude bathing?

Topic: Skiing

_____1. Do all Nordic skiers also enjoy Alpine skiing?
_____2. Where did skiing originate?
_____3. Is skiing a natural activity for humans?

Topic: Democracy

_____1. Can democracy be operationally defined?
_____2. Are people naturally democratic?
_____3. How do we know about democracy?
_____4. Why is democracy important to some people and socialism important to others?

Write questions in each philosophical area for your topic.

Topic:_____

Axiological questions:

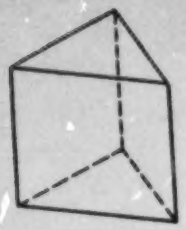
1.
2.
3.

Epistemological questions:

1.
2.
3.

Ontological questions:

1.
2.
3.

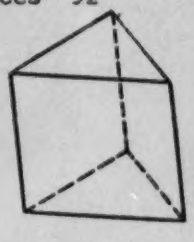


E_3 The teacher will describe how philosophical questions can be used in a unit of study as a result of reading a description of several alternatives. (Comprehension)

The order of the philosophical areas presented here is only one possibility. Using topics relevant to students' lives, you may find starting with the values issue works best. Rules in school, for example, may be questioned; why are they important? Have they always been important? These questions can lead into epistemological areas. How do we know the rules? Are there societies that don't have these rules? Further discussion may lead to ontological issues: Are these rules in accord with nature? Are they made up for the convenience of a few people? Other topics may be best approached initially from an epistemological viewpoint. In science, for example, students may be asked how they know a plant gets water. The answer can be obtained from several sources: authority, experimentation, or reasoning. The epistemological question poses the problem. Almost every topic can be subjected to philosophical questioning.

As mentioned briefly in the last section, some students will acquire the standard body of knowledge through questioning from a philosophical perspective. These students will be seeking information to further their own basic knowledge of an area, and to support their own speculations. They may only need to be confronted with a concept and asked whether or not it exists. Obscure or nonexistent concepts often provide further challenge for this type of student. Not all students, however, will display this independence of thought and action. Use of the philosophical perspective with less enthusiastic students can still take place within the structured environment of the deductively organized unit plan.

Task 6.10 - Describe how you would use the philosophical question generated in activity 5.9 to begin a unit.

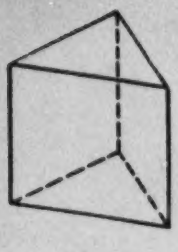


E_3 The teacher will develop culminating activities for a unit as a result of reading a description of problem solving and examples of activities. (Application)

The culminating activity of a unit uses the problem solving process to focus all the information accumulated in the unit on the problem or question posed in the introductory activity. The first part of this section focuses on the problem solving process. The second part gives some examples of culminating activities.

Although there are a variety of definitions and names for problem solving, the most concise definition offers three basic stages. First, there is a problem clarification stage followed by some sort of idea-finding related to methodology, and finally, a solution-finding process. The problem is generally stated as a question. The most important consideration at the problem clarification stage is formulating the correct question. Examining the problem situation and asking "why" for each potential question will generally broaden the problem to its most fundamental or accurate condition. For example, a teacher wants to decrease the amount of noise in her classroom so she poses the question - "How can I reduce the talking in my classroom? - Why? - Answer - "So students can get their work done." - Isn't then the question really, "How can I encourage my students to get their work done?" the broader problem that opens up more alternatives for achieving a solution then is the clarified question. Another example might be, a teacher is concerned that a very poor relationship with a building administrator will adversely influence a forthcoming tenure decision. The initial problem appears to be, "How can I improve my relationship with the administrator?" Asking "why?" again broadens the scope to "How can I insure objective treatment in a tenure decision?" Again asking why?, introduces the question of, "How can I be assured of continuing employment in my chosen profession?" This latter question opens the way for far more alternative approaches to a solution than either of the narrower questions.

Idea-finding related to the problem generally begins with gathering information followed by generating feasible solutions stated as alternative hypotheses. Obviously, Type 1 problems will not require an idea-finding phase. Hopefully, problem Types 2 through 4 will encourage substantial idea finding based on fluent and flexible responding. The list of alternative hypotheses is narrowed to the most reasonable hypothesis as part of the solution finding stage. Stage 2 in the problem solving process may require considerable fluency and flexibility if one expects an original solution or if non-standard processes are required to solve the problem. The more hypotheses that can be



generated, the greater is the likelihood that a solution will be both novel and useful. Hypothesis generation is frequently classified as a divergent, "ideational fluency" task subject to the human frailities of "set" and/or "function fixedness." i.e. a condition that tends to limit thinking to only a few alternatives. Specialized techniques including such things as attribute listing, morphological analysis and checklists as described in Davis (1973, pgs. 103-119) and the Creative Problem Solving (CPS) process (Noller, 1977) are extremely helpful in generating hypotheses.

A solution is reached when one or more of the feasible hypotheses is tested or evaluated against all available data and a match is found. The solution is almost anti-climatic if the correct question has been asked and creative, usable hypotheses have been generated. The solution may come either as an "Ah ha!" solution or may require tedious checking and verification with available data.

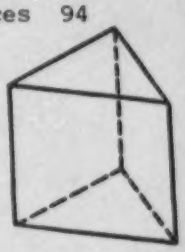
Examples of the three stage process applied to four problem types include:

Stage 1. Question finding.
Stage 2. Solution finding.
Stage 3. Solution acceptance.

Type 1 - Find the area of a triangle with a h=3" and b=4"

Stage 1 - Question clearly stated. (Comprehension)
(Question)
Stage 2 - Recall formulas for finding area of a triangle.
(Knowledge)
(Solution)
Substitute numbers in formula. (Comprehension)
Complete computation. (Knowledge)
Stage 3 - Submit answer to teacher for evaluation. (Verification)
(No student behavior)

Type 2 - How do you suppose we can use a barometer to find the height of a skyscraper?
Stage 1 - Question clearly stated. (Comprehension)
Stage 2 - Generate alternative hypothesis. (Synthesis)
Stage 3 - Submit answer to teacher for evaluation. (No student behavior) or,
Identify and support the alternative hypothesis that best solves the problem. (Evaluation)



Type 3 - If you were to change just the ending of this story to make it more interesting, how would you do it?
Stage 1 - Question clearly stated. (Comprehension)
Stage 2 - Generate alternative hypotheses. (Synthesis)
Stage 3 - Submit answer to teacher for evaluation. (No student behavior)
Determine adequacy of the answer. (Evaluation)

Type 4 - Map something that cannot be seen.
Stage 1 - Clarify question. (Analysis)
Stage 2 - Generate alternative hypothesis. (Synthesis)
Stage 3 - Determine adequacy of response. (Evaluation)

Task 6.11 - Solve each of the following problems and describe what happens in each stage of the problem solving process.

Problem 1 - How are the following numbers ordered?

0, 2, 3, 6, 7, 1, 9, 4, 5, 8

Stage 1 -

Stage 2 -

Stage 3 -

Problem 2 - List as many different ways as you can to divide eighteen in half.

Stage 1 -

Stage 2 -

Stage 3 -

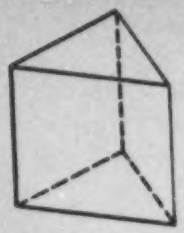
Problem 3 - Find the area of a rectangle with side a = 8cm. and side B = 4cm.

Stage 1 -

Stage 2 -

Stage 3 -

Problem 4 - Four baseball players, Jeff, Bart, Cliff and Matt and (not necessarily respectively), a first baseman, second baseman, third baseman and short stop are riding to the game on two double seats, one directly behind the other on the right hand side of the team bus.



The second baseman is sitting to the right of Matt, (who, by the way, is not the first baseman) and Jeff is sitting directly in front of Bart. Matt is sitting behind the short stop. Where is each player's position?

Stage 1 -

Stage 2 -

Stage 3 -

Culminating Activities

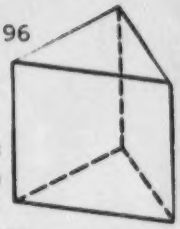
The problem solving process need not be confined to the culminating activity period of the unit. If possible, it may be effectively interspersed throughout the unit period. The problem clarification may occur during the introductory activities, during the implementation of the unit plan, and again at the end. Likewise, the idea-finding and solution-finding would seem to a natural outgrowth of gaining more information on the topic.

Culminating activities begin with a brainstorming session on what has been learned that contributes to solving the problem or answering the question (solution finding). After brainstorming, individuals or small groups of students then take the responsibility for organizing pieces of this information for presentation to the larger group. Depending on how much organization is needed, the group may want to discuss presentation format then,or wait a few days. After the presentations are ready, a practice run is held, then the final presentation made.

An example of this process is a science fiction unit in which the initial problem posed was , "What will life on earth be like in the year 2099?"

The terminal objective of the unit plan was:

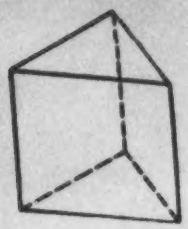
> The student will be able to identify the trends in the present which science fiction writers have developed into the realities of the future as demonstrated by an analysis of a specific work using that criteria.



The culminating activity was a science fiction fair for the entire grade level in which small groups of students were responsible for centers on various components of life on earth ir the year 2099. Each center made a prediction about its component, justified it in terms of current trends, ane engaged the audience in some sort of activity to help them to experience what life will be like in that year. One center, for example, was on animals. They predicted that the ozone layer will be destroyed based on the continuing use of florocarbons. They described the effect of no ozone layer on animals and then asked the audience to consider how their individual pets would have to adapt.

Task 6.12

Describe some possible culminating activities for use in your unit. Be sure to include activities for the problem solving stages and formulation of a culminating event.



Key

Task 6.3

1.
2.
3.
4.
5.
6.

6.2
1. 2
2. 4
3. 1
4. 1
5. 4
6. 3
7. 1
8. 2

Questions 2, 5, and 6 may involve value issues. If, for example, the travelers chose to stop by the river because they valued the view, or the water for its uses, then this would be considered an axiological question. Many decisions in literature are based on values if they are examined in depth.

Task 6.5

1.
2.
3.
4.
5.
6.
7.
8.

Task 6.7

1.
2.
3.
4.
5.
6.

Task 6.9 - Nude Bathing

1. A
2. E
3.
4.
5. E

Skiing

1. A
2. O
3. O

Democracy

1. E
2.
3. E
4. A

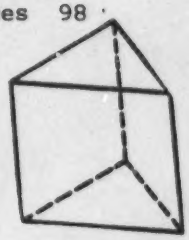
Task 6.11

Problem 1 - Type 2
- Stage 1 - Question clearly stated. (Comprehension)
- Stage 2 - Recall possible orderings (Knowledge) arithmetical, geometric, alphabetical.
- Stage 3 - Check various orderings on number sequence. (Application) Reverse alphabetical order of word representation of numerals.

Problem 2 - Type 2
- Stage 1 - Question clearly stated. (Comprehension)
- Stage 2 - Generate alternatives. (Synthesis) 18 - 2 = 9, 1 - 8, :
- Stage 3 - Submit answer to teacher for evaluation. (No student behavior) or Determine adequacy of response. (Evaluation)

Problem 3 - Type 1
- Stage 1 - Question clearly stated. (Comprehension)
- Stage 2 - Recall formulas for finding area of a triangle. (Knowledge) Substitute numbers in formula. (Comprehension) Complete computation. (Knowledge)
- Stage 3 - Submit answer to teacher. (No student behavior).

Problem 4 - Type 2
- Stage 1 - Question clearly stated. (Comprehension)
- Stage 2 - Record matrix method of organizing information. (Knowledge) Use matrix system to find solutions. (Application) Jeff = 1st, Bart = 2nd, Ma[illegible] 3rd, Cliff = short stop.
- Stage 3 - Submit answer to teacher. (No studen[illegible] behavior) or Determine accuracy o[illegible] answer from problem. (Evaluation)



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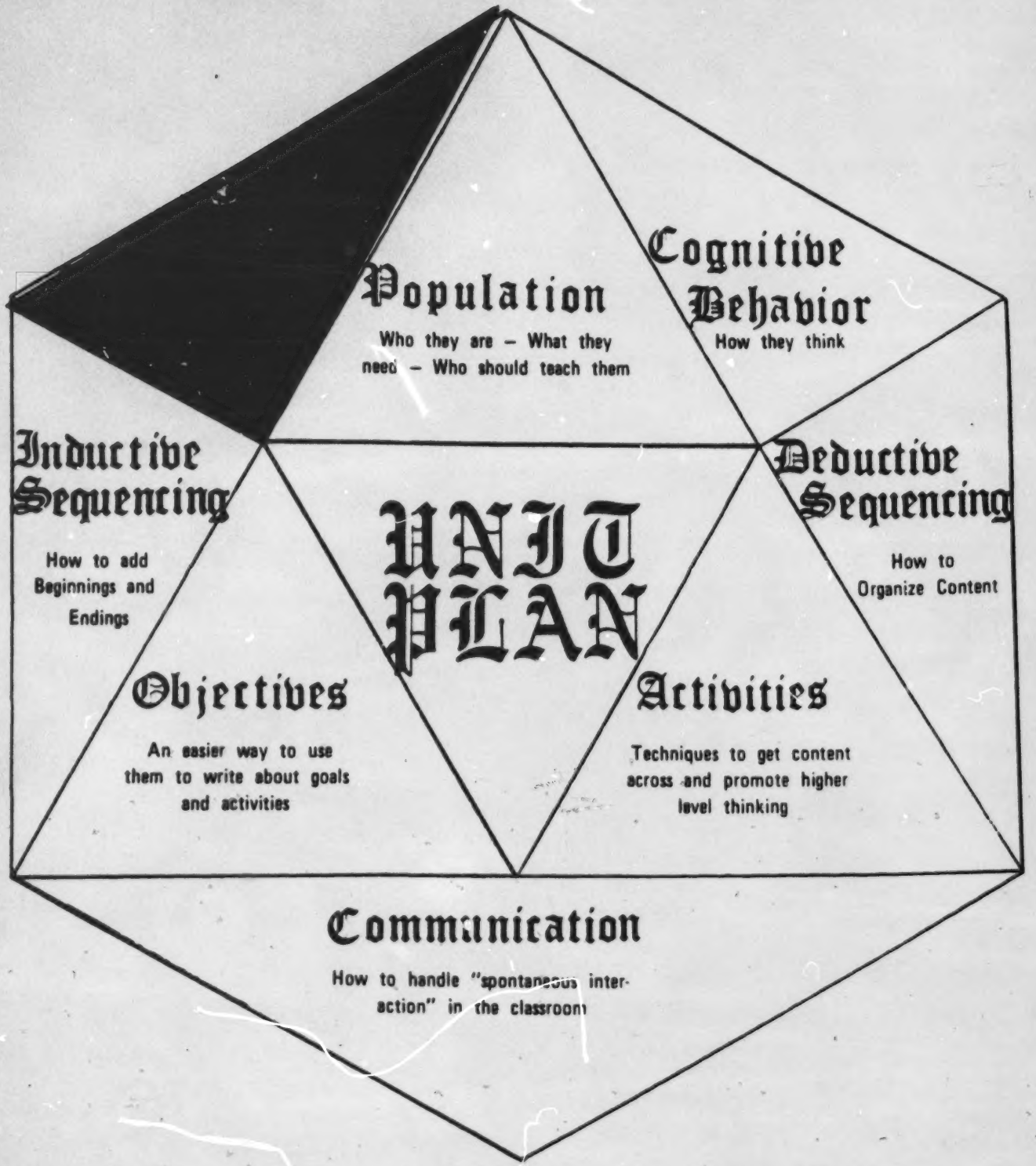
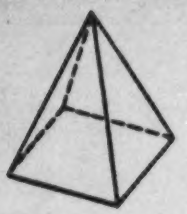

Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
UNIT PLAN
Deductive Sequencing
How to Organize Content
Objectives
An easier way to use them to write about goals and activities
Activities
Techniques to get content across and promote higher level thinking
Communication
How to handle "spontaneous interaction" in the classroom

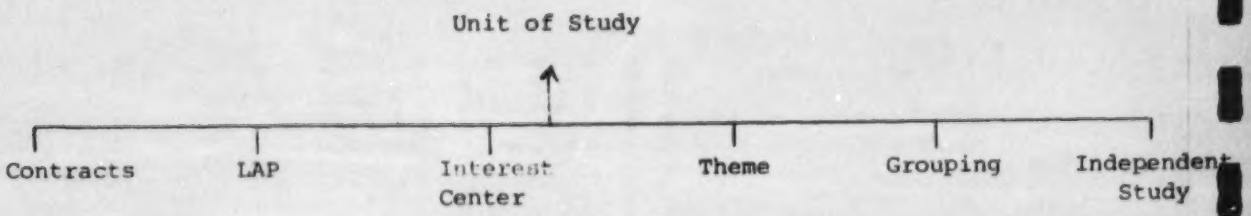


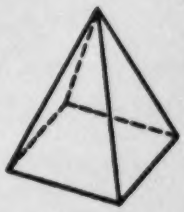
Module 7

Management Systems

T The teacher will be able to construct a unit of study using one of six management systems for intellectually gifted students as measured by checklists of criteria included in the module. (Synthesis)

E The teacher will be able to identify management systems after reading descriptions and demonstrating comprehension level behaviors associated with each system. (Knowledge)





T The teacher will be able to construct a unit of study using one of six management systems for intellectually gifted students as measured by checklists of criteria included in the module. (Synthesis)

Rationale

Learning activities developed for the purpose of insuring that students will perform behaviors stated in terminal objectives may be organized in a variety of ways. As we have already noted, instructional sequences may be organized in either an inductive or deductive approach. Now we will examine alternative means for transmitting instructional activities developed by teachers into learning experiences for students. Instructional activities are activities designed by teachers. These activities must be transmitted to students in order to become learning experiences. Transmission is accomplished through a management process. Management is defined as a technique for organizing instructional activities designed by teachers for transmission to students as potential learning experiences. All of the management systems included in this module facilitate differentiated instruction for students of different ability levels and areas of interest. That is, these systems are recommended for heterogeneously organized classrooms.

In this module, you will take the unit plan you have developed and convert instructional activities into student learning experiences.

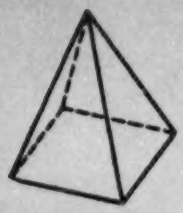
Students may acquire terminal behaviors in isolation, in small groups, or in large groups. Students may receive verbal or written directions about which behaviors are to be acquired and/or how they are to be acquired, or students may be expected to determine their own direction. A management system for gifted students will:

1. Provide opportunities for participation in higher level cognitive behaviors, and
2. Provide opportunities for students to work toward increased independence by:
   a. providing for flexible use of time, and
   b. providing for flexible use of academic content.

Meeting these conditions for gifted students may be accomplished in any one of six different arrangements or combination of arrangements. Briefly management arrangements include:

1. Learning Activity Packets (LAPs) - self contained learning experiences.

2. Learning Centers - physical locations for storage and presentation of learning activities.



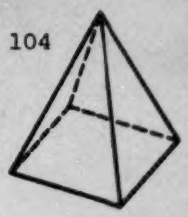
3. Grouping - student groups formed to facilitate student interaction and interaction with content and/or processes.

4. Theme Development - a broad focal point within which several specific directions may be taken.

5. Independent Study - product oriented study stressing free choice of topic and product.

6. Contracts - individual student contracts provide flexibility in both rate of progression and level of difficulty for each student.

You may examine each of the six basic management techniques included within this module and then select one system that seems appropriate for you to transmit your instructional activities into learning experiences for students. The terminal objective for this module requires only that you organize your instructional activities into one of the management systems. Examine each management system, complete the enabling objective for each system, then choose one to use for your unit.



LAP

Learning Activity Packet

T_1 The teacher will be able to organize instructional activities into a LAP as demonstrated by the criteria listed in this module.

E_1 The teacher will be able to identify each component of a LAP as a result of reading descriptions and studying an example.

Rationale

A LAP is a self-contained unit of work designed to provide students with alternative objectives and/or activities. The LAP generally delineates a purpose or rationale for acquiring the objectives defined and is organized for independent use by students. LAP's may be introduced to whole groups and some activities within the LAP may be group oriented. References, observations, and experiments outside the LAP may be cited and students may be expected to gather information from a variety of sources as well as developing a variety of activities outside the LAP. Provisions for evaluating progress within the LAP are usually included within the LAP and students can determine, based on self-testing built into the LAP, when they have satisfactorily completed it. LAP's can be used in heterogeneous settings if the alternatives cited are sufficiently varied to accommodate a range of student talent and intellectual capacities. See also: Dunn, Rita and Kenneth Dunn. Seeing, Hearing, Moving, Touching Learning Packages. Teacher, May/June, p. 48-51; and Jackson, Pat. The Writers LAP; 1969 Educational Associates, Inc.

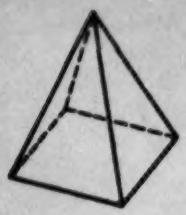
E_1 The teacher will be able to identify each component of a LAP as a result of reading descriptions and studying examples.

A LAP is a sheet of paper or booklet that contains:

1. Rationale - A rationale describes the significance of studying information presented in the LAP and/or acquiring the behaviors stated in the terminal objective.

2. Behaviorally Stated Objective - Identifies for the student the terminal behaviors he is expected to acquire as a result of completing the LAP.

3. Learning Activities - Identifies for a student the specific activities he may complete in order to acquire the terminal behaviors. Activities may be optional or required, or some of each. All activities may be included within the LAP or students may be directed to resources outside the LAP, e.g. a filmstrip, the library, interview with a community resource person, etc.



4. Evaluation - Provides criteria for the student to use in determining whether or not the terminal behavior has been acquired and what to do if it has not.

Activity 7.1

Presented below are excerpts from a LAP. Identify to which of the four components each excerpt represents.

A. _____Mastering the skill of producing numerous ideas in response to sounds will help develop creative writing skills.

B. _____Listen to the four sounds on tape and write one word that describes an image of the sound.

C. _____At the conclusion of this unit, you will be able to produce many ideas in response to recorded sounds.

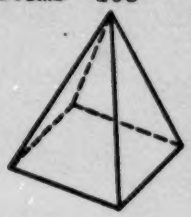
D. _____Count the number of images you have listed. Count the number of different images you have produced, i.e. images that are different eg. musical instruments are all considered one type of image, and nature scenes would be another type.

If you have listed less than five images and/or three different types of images for each sound, please repeat activities #_____, _____ & _____.

E. _____Study the definition of onomatopoeia and write a new definition in your own words.

F. _____At the conclusion of this unit you will be able to define vocabulary associated with sounds and images.

G. _____Define the following list of words and have a partner check your definitions. If you miss more than eight, please reexamine the missed definitions and repeat the test.



Terminal Task - Do not complete this task unless you have selected this management system as a way of organizing your instructional activities.

Prepare a LAP on a topic of your choosing and have a colleague determine if the following elements are contained within the LAP.

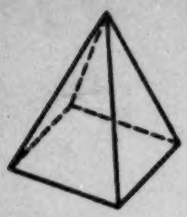
Rationale
- Appropriate reading level _____
- States significance of studying the LAP _____
- Gives convincing reasons for completing the LAP _____

Objectives
- Uses behaviorally stated terms _____
- Contains a preponderence of higher cognitive behaviors _____
- Stated in terms students can understand _____

Activities
- Clearly states what is to be done _____
- States which activities are optional and which are required _____
- Specifies a sequence if one is to be followed _____
- Tells where resources are located if not included within the LAP _____

Evaluation
- Student can tell when he has completed the LAP _____
- Student knows what to do if he fails to complete the LAP _____

If your LAP does not meet all of these criteria please revise and have it rechecked.



Learning Center

T_2 The teacher will be able to organize instructional activities in a learning center as demonstrated by the criteria listed in this module.

E_2 The teacher will identify components of a learning center as a result of reading a definition and studying examples.

Rationale

A learning center is a physical location within the classroom or school environment designed to provide a variety of starting points for student activity within one general area of investigation. Learning centers are generally attractive, appealing and invite the students' interest. Learning centers may contain a variety of objectives to be accomplished, directed activities, and/or open ended activities. Things to do in the learning center may be color coded by level of difficulty or area of interest. A record keeping system of who has accomplished what may be included in the center. Raw materials and references required for completion of activities may be a part of the center or may be located at other points in the room. Work may be done at the center or in other parts of the room based on physical constraints. Time at the center can be scheduled by individual, small groups or remain completely open-ended. Activities within the center may be changed periodically or the entire center may be changed.

The basic idea of a center is the gathering of ideas and materials designed to stimulate student interest in pursuing some avenue of investigation, creative production, or simply the acquisition of new skills and/or information. The center may have a designated sequence of activities that are organized either deductively or inductively, or the arrangement of activities may be open ended and left entirely to a students prerogative. See also: Gurske, Barbara and Bernardt, T. Cote. Learning Center Guide, California, 1972; Voight, Claude R. Invitation to Learning Creating a Learning Environment, Washington, D.C.: Acropolis Books Ltd., 1971; Morlan, John. Classroom Learning Centers. Belmont, California: Fearon Publishers, 1974.

E_2 **The teacher will be able to identify components of a learning center as a result of reading a definition and studying examples.**

A Learning Center **contains** the following components.

1. Rationale
2. Pre-test
3. Rules for using
4. Objectives
5. Student activities
6. Record keeping system
7. Self evaluation device

1. Rationale - Often, with younger students, the interest center is introduced to the entire group by the teacher. During this introduction, the rationale, as well as purpose (terminal objective) may be stated. Again with younger students, rules and written directions may be reviewed. Some or all of these steps may be an integral part of the center for older students. First time users of interest centers will benefit from a review of all seven components listed above.

2. Pre-test - A pre-test may be administered to the entire class to determine who should be assigned to the center or a pre-test may be included in the center and students given the opportunity to assess their own needs.

3. Rules for using the center - Generally describes when it may be used, who may use it, how many students may use it, and how the resources are to be handled. Location of additional resources may be noted, any special sequencing instructions and/or record keeping instructions may also be visually obvious.

4. Objectives - Both terminal and enabling objectives may be given in the teacher introduction and/or clearly presented in the center. Objectives may also form the basis for a record keeping system with students held responsible for checking off completed behaviors.

5. Student activities - Because the center is generally used by different students at different times, it is necessary to keep the activities format flexible. Activities presented on task cards seems to be most efficient. Sets of task cards may be color coded to designate various enabling objectives, level of difficulty, or levels of cognitive behavior. Color coding and number or letter designations will provide the opportunity for coding two variables, e.g. yellow cards for enabling objective #1 with cognitive level (K, C etc.) also recorded on the card.

6. Record keeping system - The center should have a system that provides students with the opportunity of recording completed activities and/or acquired behaviors. Student names down one side of a matrix with activities or behaviors across the top is sufficient. Color coding, if used, may be added to the record keeping chart.

7. Self evaluation devise - Self correcting formats for each activity and/or enabling objectives should be available so the student can determine or measure his own progress.

General - A center should be attractive and easily accessable to students. It should be a fun place to work.

Activity 7.2

List components you would include in a center for 1st graders and components appropriate for 6th graders. What teacher directions would you give to each of these groups.

Terminal Task - Do not complete this task unless you have selected this management system as a way of organizing your instructional activities.

Prepare a plan for a learning center on a topic of your choosing and have a colleague determine if the following elements are contained within the plan.

1. Physical Arrangement
   a. Does a diagram illustrate an attractive arrangement? _____
   b. Does a diagram illustrate ease of student use? _____
   c. Does a diagram include all component parts? _____

2. Pre-test questions adequately cover topic. _____

3. Student Directions
   a. Are student directions clear? _____
   b. Are student directions all inclusive? _____

4. Objectives
   a. Uses behaviorally stated terms. _____
   b. Predominately higher cognitive levels. _____

5. Activities
   a. Will students be able to find activities easily? _____
   b. Are resources for completing activities available? _____
   c. Sample task cards clear and attractive? _____

6. Record keeping
   a. Matches activities and/or enabling objectives. _____
   b. Students will be able to record their own progress. _____

7. Evaluation
   Self checking devices are available. _____

Grouping

T_3 The teacher will be able to organize instructional activities in a grouping system as demonstrated by the criteria listed in this module.

E_3 The teacher will identify components of a grouping organization as a result of reading a definition and studying an example.

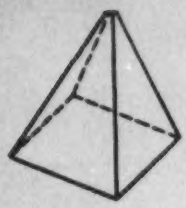
Rationale

The organization of a class into small groups is designed to meet the criteria for management of gifted students in a variety of ways. Groups may be arranged heterogeneously or homogeneously depending upon the task to be accomplished. Groups may be given a variety of different tasks depending upon ability levels and ranges. Groups may be required to achieve consensus in completing tasks or individuals may be invited to work independently on tasks within a structure defined by the group. Grouping within the classroom may be a function of predetermined assignments or may result from student choices. Or, almost any combination of the above may be utilized to meet criteria of a management system for gifted students, as long as there is provision for meeting the needs of individuals.

E_3 The teacher will identify components of a grouping organization as a result of reading a definition and studying an example.

A grouping organization is based on one of two basic assumptions. Either students require interaction on a small group basis or members of a group have needs in common with other members of the group. Specific activity organization may vary depending on the grouping basis. Interaction groups are generally formed for the purpose of modeling - that is, students with superior skills are included in groups with students who need to acquire those skills. Common needs types of groups are generally working on the same type of task because of achievement and/or interest levels.

Interaction groups will generally be given the same set of directions and all groups will be working toward the same or similar sets of goals. Group oriented projects such as plays, skits, T.V. programs and simulation games may serve as activities for these groups. Generally there will be some group consensus required and often there will be a division of labor within the group.



Common needs types of groups are generally a collection of individuals, each working on their own task with limited interaction. These individuals constitute a group only because it is easier to give several individuals the same task rather than a separate task for each individual. A classroom, for example could be subdivided into four ability level groups of:

1. Basic knowledge and comprehension level tasks
2. Application tasks
3. Analysis level tasks
4. Synthesis tasks

and any unit of work broken up so that each group completes all activities at its designated level.

Grouping commonly allows the teacher an opportunity to spend time with one group while other groups are working independently. The teacher may then rotate her time across groups for periodic evaluation, task orientation and/or diagnostic purposes. In order for this to occur effectively, each group must have sufficient direction to carry out its responsibilities for at least short periods of time.

Grouping may be flexible during any one unit and changed from one basis to another depending upon goals.

The basic need for a grouping arrangement is therefore; 1) multiple levels within one basic theme or topic or, 2) directions for interactive activities to be carried out within the group.

Activity 7.3 In which grouping organization would each of the following be likely to occur?

A. _____ Select a common animal and develop a skit to illustrate how that animal relates to other animals in its environment.

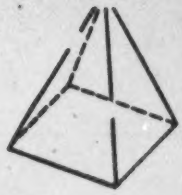
B. _____ Write a poem that describes your feeling when you first awake in the morning.

C. _____ Describe the geography of an island by interpreting the symbols presented on the attached map.

D. _____ Create a plan for a model pyramid.

E. _____ Develop pro and con arguments for nuclear energy.

F. _____ Develop a plan for building a model city and list the tasks that will be required in order to build the model.



Terminal Task - Do not complete this task unless you have selected this management system as a way of organizing your instructional activities.

Develop a plan for assigning individuals to groups - interactive and/or common needs - and have a colleague apply the checklist provided below to determine if your plan is adequate.

1. Basis for identifying and assigning members to groups is consistent with grouping basis. (Interactive - Common Needs) _____

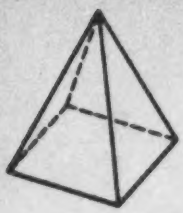
2. Instructions for tasks are adequate. _____

3. (Interactive groups) There are opportunities for different roles. _____

4. (Common needs) Higher level cognitive behaviors predominate for intellectually superior students. _____

5. Teacher's role for interacting with groups is defined. _____

If you have failed to meet all criteria please revise and have your plan rechecked.



Theme Development

T_4 The teacher will be able to organize instructional activities in a theme as demonstrated by the criteria listed in this module.

E_4 The teacher will identify components of a theme as a result of reading a definition and studying examples.

Rationale

A fourth approach to management is generally classified as theme development and more specifically defined in, "The Davis Model" (1978). The Davis Model (presented in its entirety below) is most effectively used with an inductive sequence. In fact, freedom required to focus on personally relevant topics can be partially destroyed by attempting to structure the process in a deductive arrangement. A unique feature of theme development is the brainstorming used in Stage 1 and mapping structure for collecting ideas.

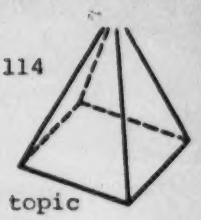
E_4 The teacher will identify components of a theme as a result of reading a definition and studying an example.

The Davis Model for Unit Development has four stages. (see pg. 119). It proceeds from the introduction of the topic by the teacher and a series of teacher-directed activities which immerse the students in the topic to a second stage in which the students commit themselves to doing an individual project on the topic. The third stage is comprised of a teacher-directed review of the knowledge base of the topic and student progress reports on individual projects. The final stage in the model involves the presentation of the products of student research and an evaluation of knowledge on the topic.

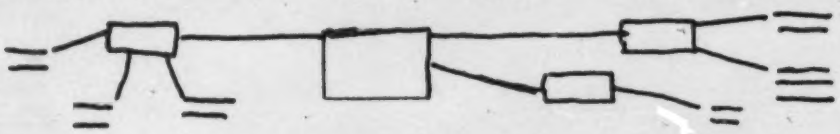
The purpose of Stage 1 is to totally immerse the students in the topic, not through instruction in facts, but through questioning and thinking. Stage 1 has no content goal, i.e. students will not emerge from it knowing "x, y, z." On the contrary, it is intended that the student will leave Stage 1 knowing only that he does not know something that he wishes to know. The process throughout Stage 1 is divergent production.

The teacher may initiate discussion of the topic by conducting a brainstorming session. On the topic of science fiction, for example, the students might be asked to list all the things that they consider science fiction. Their responses might include some of the following:

Spiderman	Frankenstein
Star Wars	Peter Pan
20,000 Leagues Under the Sea	Close Encounters



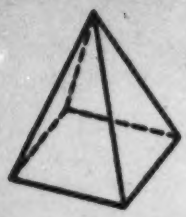
Student ideas are recorded on the blackboard with the central topic in a box in the center. Lines drawn out from the box lead to extensions of the main topic and these new headings in turn lead to new associations. e.g.



A completed map presents a wide range of routes for investigation. For example, starting with the topic Seagull leads to habitat, oceans, migrating routes, "Jonathan Livingston _____", bird sounds, flight etc. Teachers may get a feel for the possible routes to be taken by constructing maps prior to their actual introduction in the classroom. However, the classroom map should be primarily a student product. After listing all of the students' responses, the teacher asks them to categorize the things they listed and then extend the lists for each category. This sequence of brainstorming, categorizing, and elaborating may extend over a period of three or four days. In the meantime, other activities are taking place.

In a science fiction theme, for example, the students may view a science fiction film and write their own questions for discussion. Or, they may be challenged to role-play a character from the film or speculate as to "what I would have done..." They read (and/or are read to) science fiction short stories and discuss what the stories have in common and how they are different. They hear poetry which is science fiction. They view art which was produced for science fiction. They discuss analogies like; science is to science fiction as..... They react personally to science fiction by adding themselves as a character in a story, critiqueing a work, or hypothesizing about how they would relate to a science fiction writer or character as a person. They imagine sequels to plots they have encountered and outline original works in response to science fiction music. They expand or condense characters through dialogue or monologue. They illustrate science fiction works. All these activities are a part of Stage 1 of the model and take place in large group settings under the direction of the teacher. The most accurate estimation of length for this stage is obtained from the students. When they begin to indicate they would like to find out more about "this" or "that", it is time for Stage 2.

Stage 2 begins the convergent process for students. Each student must make an individual and written commitment (project proposal) to do a project on the topic. The students have sampled a wide range of products as well as areas of investigation. At this point the student is evaluating the vast amount of information at hand and his or her own personal interests, and making a decision to pursue something in particular. During Stage 2, students receive clarification of resources and product possibilities, and guidance in research techniques from the teacher, but they are directing their own project and organizing their own learning experiences. Optional small group sessions focus on such issues as "If I were investigating the life of an author, I would..." and "How to find out about science fiction that has become a reality."



These teacher-directed small groups are scheduled in response to students' needs. The management system during this stage must allow for the flexible scheduling of all activities so students can work independently and in small groups.

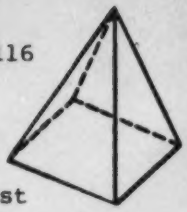
There are two parts to Stage 3. First, progress reports by individuals are given to small groups for feedback and suggestions. Each student then finalizes his own plan for the completion of his product by the announced deadline. This final plan is reviewed by the teacher and student in an individual conference. At that time the teacher can also identify any student needs which may have arisen and assist with any problems. The second part of Stage 3 concerns the minimum knowledge base required by the teacher or curriculum on the topic. The teacher establishes the criterion (amount/areas of knowledge) that all students must meet to pass the unit. In many cases this will be review for the students, but it is essential to formally establish the grounds for evaluation so there is no misunderstanding as to the expectations for the unit. During Stage 3 the teacher continues to meet with students individually and in small groups to meet their needs, focusing mainly on the basic knowledge requirements. In science fiction, for example, the minimum requirements for knowledge are the following:

The student will be able to brifely describe the history of science fiction as a literary genre.
The student will be able to identify a work as science fiction or not science fiction and support his or her conclusion with evidence from the story.
The student will be able to describe the five most famous fiction writers and at least one of each of their works.

In Stage 4, the students share their products with the class. Each student receives a copy of the presenter's project proposal and evaluates his product in terms of it. In addition, the students are tested on the objectives outlined in Stage 3. The questions, however, require more than simple recall. Instead, they assume the basic knowledge and require the student to go beyond it. The science fiction test follows:

Choose one of each two to answer:

1. Briefly outline the history of science fiction as it will be written for the next fifty years.
   Rewrite science fiction history as it would have developed if motion pictures had not been invented.
2. Define "artistic fiction" and briefly describe how a particular science fiction work might be modified to fit this category.
   Modify your favorite fairytale to fit the definition of science fiction as you understand it.
3. Choose one of the five major writers and describe what the effect would have been on a particular work if he had been blind.
   Describe the characteristics of a "great science fiction writer."



Such synthesizing forms the core of the entire model. All these test questions require the student to take a new perspective in the information he or she has acquired. Evaluation of responses to questions is made on the basis of the degree to which the student heeded the problem conditions, the extent and coherence of the support offered, and the consistency of the conclusion. It is especially important that the evaluation be in terms of the students' own proposals and in terms of the problem condition stated in the test item. Otherwise, the entire process of student responsibility in thought and action is negated through the imposition of an external standard.

In review, the four stages and their components are:

Stage 1 - IMMERSION, Activities include the following:

Brainstorming	Poetry appreciation
Categorizing	Art appreciation
Elaborating	Personally reacting
Role-playing	Critiqueing
Attribute listing	Examining implications
Comparing and contrasting	Illustrating
Questioning	Music appreciation

Stage 2 - COMMITMENT, Individual students decide what, when, where, and how about a particular area of the topic. They write project proposals and line up resources. They begin research.

Stage 3 - REVIEW

a. Project proposal review and revision, final product commitment.
b. Review of minimum knowledge requirements as criterion for evaluation.

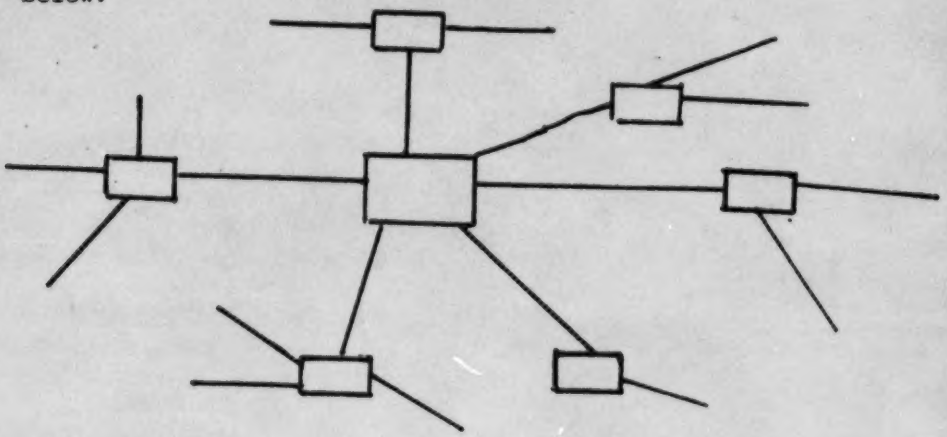
Stage 4 - EVALUATION

a. Project presentation
b. Synthesis question test

The process begins with divergent thinking so that as many ideas as possible are explored. To leave it at this, however, may result in the students learning many unconnected details. The process shifts, therefore, at Stage 2 to convergent thinking in an area of personal interest to the student. Finally, the "basics" of the topic are received and some closure is achieved through the completion of projects. The door is thrown open again, however, for further thought investigation and research through the use of synthesis questions on the final examination.

Activity 7.4

Construct a map around the topic Pluto. The map is started below.



Activity 7.5

Briefly describe, in your own words, each of the four stages in the Davis Model.

Stage 1

Immersion

Stage 2

Commitment

Stage 3

Review

Stage 4

Evaluation

Terminal Task - Do not complete this task unless you have selected this management system as a way of organizing your instructional activities.

Construct a map illustrating the major topics and subtopics included in your unit of study. List the resources to be used in the immersion part of the plan, list the types of products that might emerge from investigation of the topic and identify the resources you would have to provide in order to make the unit successful.

Have a colleague apply the checklist provided below to determine if you have met this objective.

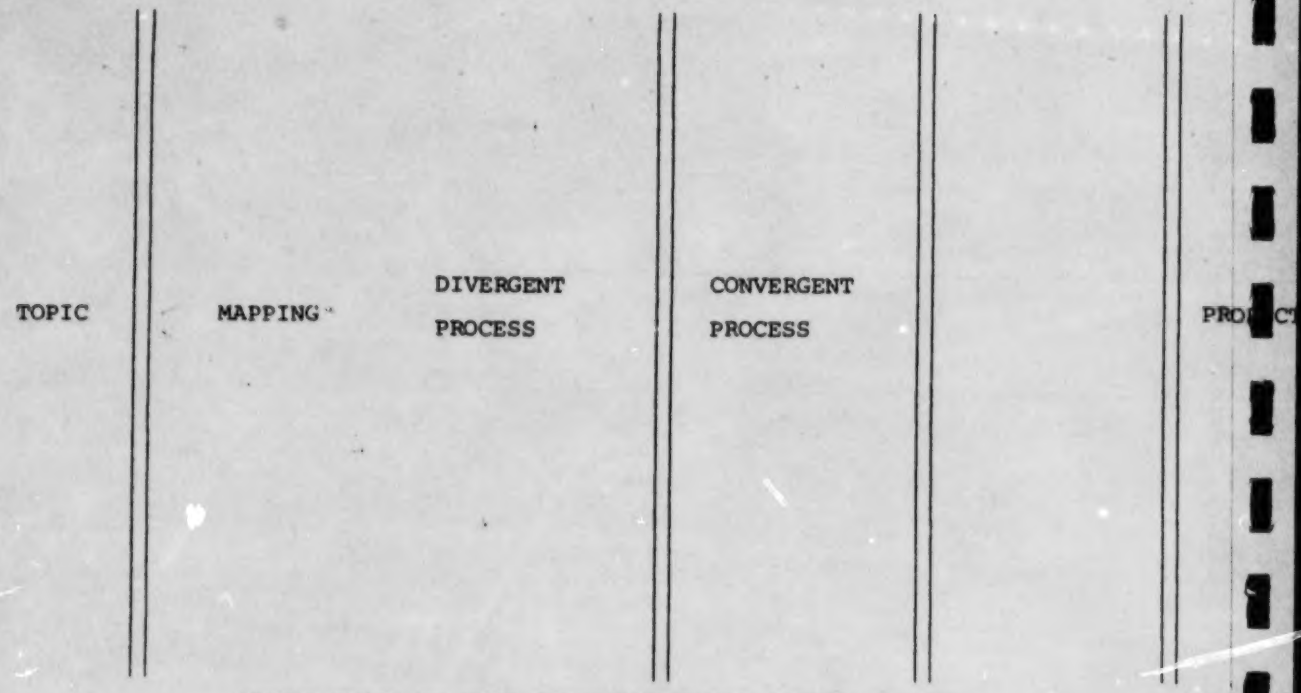
1. Map is comprehensive and includes routes for investigations in math, literature, science and social science. _____

2. Immersion resources are motivating and informative. _____

3. Product suggestions are reasonable goals for intellectually gifted students. _____

4. Adequate resources are available for completing the products. _____

Revise if criteria are not satisfied.



DAVIS MODEL OF UNIT DEVELOPMENT FOR GIFTED STUDENTS

Independent Study

T The teacher will be able to describe how to use "independent study" as an individualizing technique (as measured by a checklist of criteria for evaluating an independent study program). (Comprehension)

E_1 The teacher will be able to define "independent study" as a result of reading a description of it. (Comprehension)

E_2 The teacher will be able to identify students for independent study programs as a result of reading about the type of student who qualifies. (Comprehension)

E_3 The teacher will be able to describe the process of directing a student's independent study as a result of studying a description and several examples. (Comprehension)

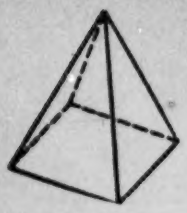
Rationale

"Independent Study" is an instructional technique which can be used to achieve individualization. It is often thought of as a traditional exercise reserved for older and/or advanced students. The thesis, term paper, and dissertation are all the result of independent study but to define it in terms of these exercises is to limit the concept severely. Although the product is essential in independent study, it is not its only defining characteristic. Nor is age or expertise essential.

Instead of the traditional notions, an independent study project can be more accurately associated with pursuing a tangent, elaborating on a digression or chasing an "elusive butterfly" far afield. It is the pursuit of some knowledge or integration that can best be achieved alone.

When teachers do use the technique of independent study, they create more powerful learners. They are teaching the kind of learning that takes place for the 75% of the total life span not spent in "institutions of learning".

This approach is more concerned with student decision-making than with content and should be used to extend a students thinking beyond the basic requirements of most units of study. Do not expect to "cover" a predetermined body of content with this approach.



E_1 The teacher will be able to define "independent study" as a result of reading a description of it.

Independent study is the process in which an individual gathers and/or manipulates information in a structure of his own design on a topic of his own choosing. It results in a product which can be shared.

The key to independent study as a discrete concept is the phrase "in a structure of his own design." It is an opportunity for the student to construct his own plan to achieve a goal. He can seek help in constructing that plan. He may need help in drawing up a realistic time frame, or locating helpful sources of information. The teacher will probably be the main source of much of this information. In a sense, the responsibility for structuring study has been shifted from the teacher to the student - "the shoe is on the other foot" so to speak. The ultimate decisions about when to work, what to do, how to organize it is up to the student who is doing independent study.

The product to be shared is essential because it focuses the entire process on a goal. Independent study <u>is</u> goal directed activity. The sharing brings the independent thinker back to group, forcing him to get feedback and polish his ideas. Even in primary grades, this sharing often looks like a colloquium in which the emphasis is on constructive criticism.

The student's right to choose the topic is crucial. Independent study is difficult, and the sustained motivation necessary can best be achieved as a result of a personal commitment on the part of the student. Choosing the goal gives the student a kind of ownership over the project which helps in difficult moments.

Activity 7.6 Write a definition of independent study.

E_2 The teacher will be able to identify students for independent study programs as a result of reading a discussion of the type of student who qualifies.

Any student who is motivated, can make decisions, and can communicate his ideas is a candidate for an independent study project.

The "motivation" is specifically a curiosity about something - a need to know. A student has to recognize he doesn't know something and then want to know it. In some people this is a natural tendency. They are always discovering something they do not know anything about but would like to. They want to know badly enough to find out. Teachers can create "want to know" situations by presenting tidbits of information at the "tips of icebergs." In primary grades, this might be just the fact that there are dozens of shades of blue that all have names. Students of geometry may be intrigued by "the most beautiful rectangle."

Decision-making on the part of the student in an independent study program is constantly required. A student who asks questions about paper size, writing utensil type, composition length, etc. is not usually a candidate for independent study. The student must not only make those decisions, but also decisions about the organization of time, materials, and information. He may seek input from the teacher to make his decisions but not the decisions themselves.

Since the product must be shared the student must be able to communicate her ideas in some medium. The process of independent study also requires communication. Because the teacher is not establishing and directing the steps of the learning process, an on-going dialogue between teacher and student is maintained. The student shares with the teacher the things he is thinking and doing on his project.

Activity 7.7 Describe the independent study student.

E_3 The teacher will be able to describe the process of directing a student's independent study as a result of studying a description and several examples.

The process of directing a student's independent study can be reviewed in terms of four components: the environment, the task, the teacher's role, and the student's role.

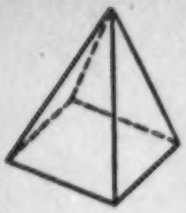
The learning environment which supports independent study is characterized by a wide variety of shared information. Things of interest to the students and teacher are displayed everywhere. There is a profusion of resources - paper, markers, file folders, books, magazines, reports. The atmosphere is one of shared inquiry. Everyone is interested in something and the classroom is their forum.

A teacher can create such a learning environment by always showing an interest in what the students are interested in. A good way to begin is with an interest inventory. The teacher can model sharing by talking about some personal interests and sharing books and other resources she has used to expand her interest. New topics from the curriculum can be personalized by asking for student input from personal experience.

Even though these activities are not academic, they are preliminary to independent study in an academic area because they set the tone for sharing. The idea is to make sharing easy and valued so students will be comfortable pursuing their own ideas and sharing them. These activities will help students to feel that the teacher and others in the class appreciate and want to hear their ideas.

The Task

In independent study, the teacher and student establish the task together. The requirements are that there be a product to be shared, and that throughout the process the student communicate with the teacher on a regular basis.



The initial meeting to establish the task for an independent study should focus on the selection of a topic, a review of the requirements, and setting a date for the next conference.

The focal point of each successive conference is dependent on the pace the student sets, but content of these conferences should be something like the following:

1- Selection of a topic, review of requirements, setting date for next conference.
2- Clarification of chosen topic (narrowing if necessary), discussion of possible resources, listing of questions to be answered, setting date for next conference.
3- Progress report on information gathered, discussion of possibilities for organizing information, setting date for next conference.
4- Review of information gathered, check on questions asked at beginning, redefinition of topic, setting date for next conference.
5- Discussion of ways to share information, and how to set and accomplish goals for a presentation, setting date for practice run.
6- Practice run of sharing session.

At each stage of the independent study process, both the teacher and student have responsibilities to fulfill.

The Teacher

At each stage of the independent study process, the teacher is serving as a resource for the student, providing him with help in gathering, organizing and sharing information. The conferences are directed by the teacher to discern the student's progress and current needs. Mini-lessons on the topics mentioned in "Task" also occur. Sometimes several students may be moving through this process at about the same rate. If so, the mini-lessons may be conducted with that small group. Each student should also have an individual conference to set specific goals for the period of time before the next meeting.

The teacher's responsibilities during the independent study process are:

1- Establish requirements.
2- Monitor the student's progress.
3- Provide constructive feedback.
4- Instruct the student in research techniques.
5- Evaluate student's work.

Evaluation of independent study projects is based on how well the student met the original goals, how well he participated in the process, and how effectively he shared his product. The evaluation of accomplishment of goals and effectiveness of the sharing are done with the student. The evaluation of how well the student participated in the process is

done by the teacher. It includes the depth of the research, degree of preparation for conferences, and the degree of responsibility assumed by the student.

The teacher should keep a folder on each child doing an independent study that includes his proposed topic, notes on conferences, and any other pertinent information.

The Student

After a few students have done an independent study, others will be asking about it. To help the student decide if he should undertake an independent study project, he should receive a copy of the following questions:

1- Are you interested in knowing more about something?
2- Do you enjoy figuring things out on your own?
3- Do you like to organize information?
4- Do you like talking about the ideas you're working on and the things you are doing?
5- Can you teach people about things you know about?

If you answered yes to all of the questions above, you would probably like doing an independent study . It gives you a chance to do some thinking and investigating on your own and get credit for it besides.

When a student decides to do an independent study he signs the following contract:

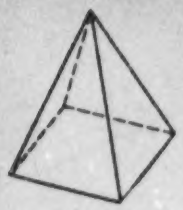
In fulfillment of the requirements of an independent study, I agree to:

1- Investigate a topic of my own choosing.
2- Prepare a product to be shared.
3- Participate in the evaluation of my performance in the independent study process.
4- Communicate with the teacher on a regular basis during the process.

Name_____ Date_____

Proposed topic of investigation_____

Activity 7.8 Describe the process of directing an independent study in terms of the four components of environment, task, teacher, and student.



Terminal Task - Do not complete this task unless you have selected the independent study option as a means for transmitting your activities to students.

Describe how you would structure the environment to facilitate independent study and describe the process of setting up independent study programs within your unit of study.

Have a colleague apply the following criteria to determine if you have met this objective.

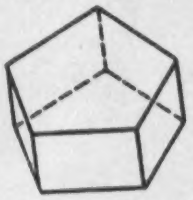
1. Is the environment conducive to student selection of a topic? _____

2. Has the student been given an opportunity to acquire sufficient background of knowledge and skills for independent study? _____

3. Are there ample opportunities for choosing a topic as an extension of this unit? _____

4. Does the plan for independent study specify student and teacher responsibilities? _____

Revise if needed.



3. Small group is talking so loudly, neighboring students complain that they can't concentrate on their work.

4. John (returned from isolation) sits sullenly at his desk doing nothing.

5. Betsy, with whom teacher is having conference has failed to complete her contract.

E_4 The teacher will be able to describe the use of "Magic Circles" as a result of reading about the use and application of "Magic Circles". (Comprehension)

The magic circle is a systematic procedure designed for several specific uses. Bessell and Palomares (1973) recommend the circle arrangement as the basis for a human development program while authors like Glasser and Gordon use a circle type arrangement for establishing group participation in group decision-making and group problem-solving. Bessell and Palomares recommend that the magic circle at grades K-4 be developed over time. They recommend starting with three groups and building up to the full class circle over a time period of from three to 24 weeks. Variations in development depend on class composition.

The magic circle arrangement provides for:

1. Focusing attention on a speaker.

2. Establishing eye contact between speakers and listeners.

3. Focusing attention on listening.

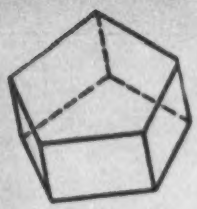
4. Securing contributions from everyone who wishes to contribute.

5. Establishing and practicing rules for speaking and listening.

6. Conducting a variety of class discussions including decision-making, problem-solving, exploring feelings, and introducing units.

Procedures for operating within the circle are generally established with topics that provide opportunities for non-threatening and positive type responses. e.g. "I really feel good about _ _ _ _", where each child in turn has an opportunity to respond or pass. Confidence in responding and discussion is developed to the point where real problems can be solved, feelings can be shared, e.g. "How I felt when I did not get attention." and opinions expressed, e.g. "I did not like it when the teacher _ _ _ _."

Numerous specific activities for establishing and maintaining the magic circle are provided in the Bessell and Palomares material.



Task 8.8 Write in your own words, a brief description of magic circle.

Terminal Task - Briefly describe how you would plan to apply the concept of social independence in your unit of study. Give at least one specific example of how the concept can be associated with a specific activity within the unit.

Student Contracts

T_6 The teacher will be able to organize instructional activities into a system of student contracts as demonstrated by criteria listed in this module.

E_6 The teacher will be able to identify components of a contract after reading a description and studying examples.

Rationale

Student contracts provide a flexible system for teachers to control differentiation of instruction. Individual students may be assigned (or may decide in consultation with the teacher or may decide on their own) objectives to be mastered, resources to be used, activities to complete, and/or time line to follow. The formal contract between teacher and student states what is to be accomplished by a given deadline and the teachers primary responsibility is in assuming clear direction, access to appropriate resources and monitoring progress. Excellent opportunities for student decision-making exist in this management system.

E_6 The teacher will be able to identify components of a contract after reading a description and studying examples.

Initial use of contracts by students will require more detailed instructions and fewer choices than will contracts with more experienced students. Presented below are samples of contract decisions that illustrate progression from initial use to use with experienced students.

Contract 1
List resources on the contract - student checks which resources he will use to complete an activity.

Contract 2
List activities - student checks which ones he will complete, and deadlines by which they will be completed.

Contract 3
List objectives and specify activities to be completed for each objective - students check objectives to be mastered, activities to be completed, and deadline for each.

Contract 4
Repeat 1-3 but this time add an opportunity for the student to add alternatives of his own choosing.

Contract 5
Repeat #4 but require that the student add at least one alternative of his own.

A sequence of limited choices to more choices to constructing alternatives is illustrated in this progression of contracts. More sophisticated and individualized contracts can be made by teachers working with experienced students in which all of the alternatives are developed during conference time. Contracts may be used in conjunction with independent study and/or theme development. All contracts are signed by both the teacher and the student and each retains a copy.

Contracts may be distributed at the beginning of a unit or class period, they may be developed by students during a planning time or they may be developed jointly during conference time. Deadlines may vary from one day to one week or even longer, depending on student need for direction.

Resources for completion of contracts are generally available within the classroom. Occasionally however, resources may be located in the library, resource room, art room, or even the community.

Activity 7.9 Develop a contract that allows for either selection or construction of both objectives and activities to be completed by the student. Include on the contract all necessary directions for the student.

Terminal Task - Do not complete this task unless you have selected the option for organizing your instructional activities.

Make up contract forms to be used by students in completing activities and/or projects in your unit of study and list the resources that will be available for students to use. Describe what both the slowest and sharpest student in this class might be expected to complete.

Have a colleague check your contract and plan using the following criteria.

1. Is it clear what decisions the student is to make? _____
2. Are the requirements stated? _____
3. Are there options? _____
4. Are resources _____
5. Is the range between slow and sharp student adequate? _____

AFTER you have studied the six management systems - complete this objective.

E The teacher will be able to identify management systems after reading descriptions and demonstrating comprehension level behaviors associated with each system.

Examples of Management Systems for different units of work.

A. A second grade teacher has the goal of helping students increase their ability to generate ideas for writing creative stories about their personal experiences.

1. LAP - A learning activity packet could be structured around recalling specific personal experiences and then using specific creativity tools (morphological analysis, attribute listing) to generate multiple ideas related to that experience. A final task would be to put these ideas together in a story.

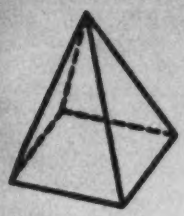
2. Learning Center - Task cards sequenced in a learning center would require students to recall personal experiences and to apply creativity tools to each experience. A number of task cards could be included to assist some students focus on personal experiences. Putting together creative ideas into a story would be the same terminal task as in a LAP.

3. Grouping - Groups could be formed based on vocabulary level or common experiences. Groups could write a play with each member assuming specific roles after initial writing has been completed. Each student could write about personal experiences following a brainstorming session within the small group (good leadership opportunity).

4. Theme Development - A large group session would focus on creative writing and fluency vocabulary associated with personal experiences. A collection of experiences and words would be collected and recorded on the blackboard and possibly recorded for more permanent use. Each student would then begin to focus in on their own experience and finally to write their own story.

5. Independent Study - Individual students can be given the task of designing a plan for developing a creative story about a personal experience. Options for format and creativity exercises could be presented to the student (or recalled from earlier activities) and the student encouraged to choose the one best suited to his purposes.

6. Student Contracts - A list of fluency activities could be offered on student contract forms and students invited to check the activities they would like to complete. Location of each activity could be given to the entire group verbally or on a classroom map.



Activity 7.10 Determine in which management system each of the following events is most likely to occur.

1. _____Each student is given a booklet containing objectives, activities, and self-correcting forms for completing a unit of study on ecology.

2. _____Five groups are formed and each group is given the task of analyzing one type of literature for a presentation to the entire class.

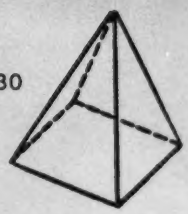
3. _____Three students have demonstrated a high level of interest in the topic of deserts and you have decided to provide them with time to pursue their interest.

4. _____Each student is given a list of optional objectives and activities for a unit of study on animals. Each study must select 5 objectives from column 1 and 3 objectives from column 2 and complete at least 2 activities for each objective selected.

5. _____The entire class brainstorms on the topic 'Iceland' with the teacher recording information on the board in a mapping structure.

6. _____A series of task cards and resource materials for the study of creative writing have been arranged in an attractive display near one end of the room. Students are requested to complete a designated set of tasks and record their progress on a checklist.

Now - Select one management system and organize your instructional materials for presentation to students within that system. Guidelines for developing the system are provided and criteria for evaluating your product has been provided.



Answer Key

Activity 7.1

A. Rationale
B. Learning Activity
C. Behavioral Objective
D. Evaluation
E. Learning Activity
F. Behavioral Objective
G. Evaluation

Activity 7.2

1. Rationale
2. Pre-test
3. Rules for using
4. Objectives
5. Student activities
6. Record keeping system
7. Self evaluation device

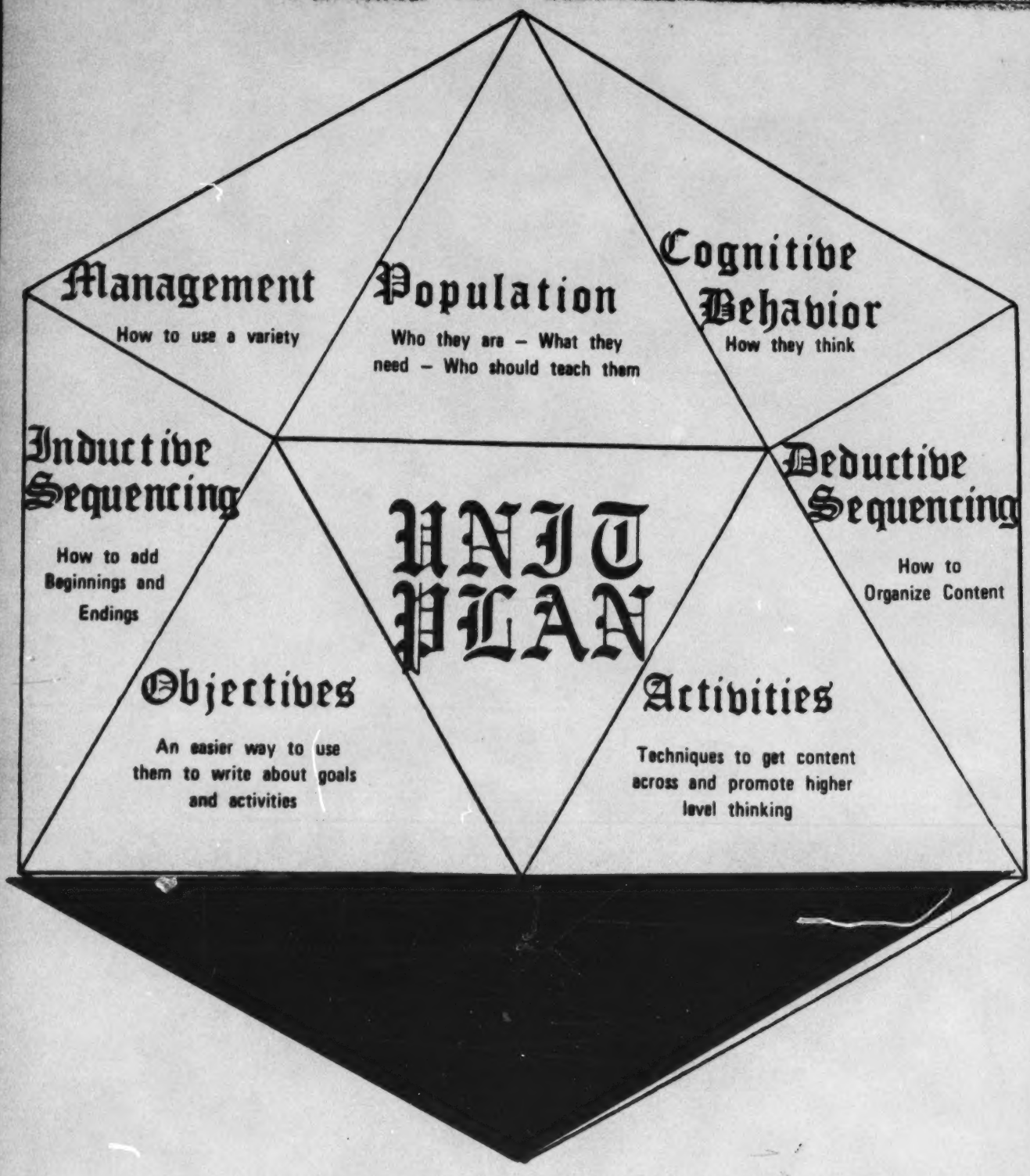
The same components would be appropriate for both 1st and 6th graders. Teacher directions for both groups would include an explanation of the use and purpose of a learning center, and of the specific activities and requirements of this one.

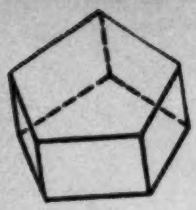
Activity 7.3

A. Interactive
B. Common needs
C. Common needs
D. Interactive
E. Interactive
F. Interactive

Activity 7.10

1. LAP
2. Interactive Grouping
3. Independent Study
4. Contract
5. Theme
6. Interest Center


Management
How to use a variety
Population
Who they are – What they need – Who should teach them
Cognitive Behavior
How they think
Inductive Sequencing
How to add Beginnings and Endings
UNIT PLAN
Deductive Sequencing
How to Organize Content
Objectives
An easier way to use them to write about goals and activities
Activities
Techniques to get content across and promote higher level thinking



Module 8

Communication

T The teacher will be able to select the strategy that will lead to facilitating teacher-student communication as measured by a test of, "Teacher Responses to Simulated Classroom Conditions." (Comprehension)

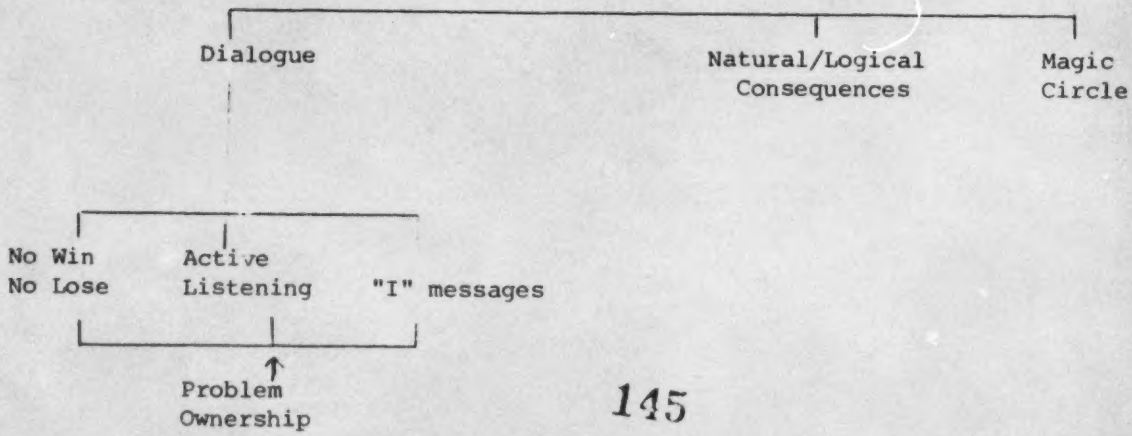
E_1 The teacher will be able to identify problem ownership as a result of studying definitions and examples of problem ownership. (Evaluation)

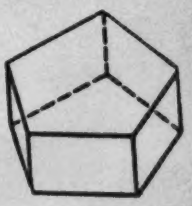
E_2 The teacher will be able to construct dialogues using "No Win - No Lose Conflict Resolutions," "Active Listening," and "I Message" statements as a result of studying definitions, explanations, and examples of teacher-student interchanges. (Application)

E_3 The teacher will be able to construct material and logical consequences for classes of student behavior as a result of examining explanations and examples of natural and logical consequences. (Application)

E_4 The teacher will be able to describe the use of "Magic Circles" as a result of reading about the use and application of "Magic Circles". (Comprehension)

Select a Strategy





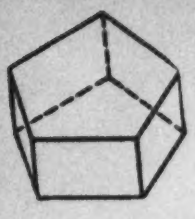
T The teacher will be able to select the strategy that will lead to facilitating teacher-student communication as measured by a test of, "Teacher Responses to Simulated Classroom Conditions." (Comprehension)

I. Rationale

A general classroom environment conducive to student exploration in higher level cognitive behaviors is necessarily based on mutual trust, respect, and openness. Students must be allowed to make mistakes in order to feel the freedom necessary for open exploration. They must recognize that their decisions are important and that they, alone, are accountable for the consequences of their decisions. They must recognize that there are seldom single answers to any one problem but rather there are a range of solutions based on available information and prevailing conditions.

An environment that allows these conditions to develop requires that teachers serve in the role of a facilitator rather than the role of a director. The teacher must be responsive to the information, skill base and feelings of students. The teacher must establish conditions that contribute to student decision-making in all classroom related areas. These conditions must be established with respect to both the social and academic behaviors of students. Independent learning can only occur in an environment that fosters social independence.

An effective social environment appears to be a function of communication patterns currently being advocated by such authors as Thomas Gordon and Hiam Ginott. Familiarity with the tools these authors have developed will assist you as a teacher in reaching the goal of creating an environment conducive to the development of student social independence. The basic reference for objectives 10.1 through 10.4 is Gordon, Thomas; T.E.T., Teacher Effectiveness Training, 1974, Peter H. Wyden, New York. The reference for Objective 10.5 is drawn primarily from the literature on behavior modification and personal experience. No additional material is suggested at this time. Objective 10.6 is based on the Human Development Program (5 volumes) developed by Harold Bessell and Uvaldo Palmares; Human Development Training Institute; 4455 Twain Avenue, Suite H; San Diego, California 92120.



E_1 The teacher will be able to identify problem ownership as a result of studying definitions and examples of problem ownership. (Evaluation)

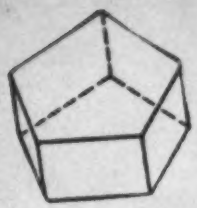
The "Teacher Effectiveness Training" (T.E.T.) approach endorsed by Gordon is based on mastery of three specific teacher behaviors. Behaviors are classified as; "active listening", "I messages" and "No-win, No-lose conflict resolution." Specific responses are however, based on problem ownership. Problems may be owned by students, teachers or jointly by the student and teacher. Problems owned by students are generally caused by feelings that prevent them from successfully engaging in the learning process. Teacher owned problems are caused by those situations interfering with the teacher's responsibility for teaching and maintaining an orderly classroom. Jointly owned problems are created when students' personal needs conflict with teacher needs.

Examples - Presented below are several problem conditions and an identification of ownership.

Problem	Owner
1. Child talks during quiet reading time.	Teacher or class - violation of class rules. This is a problem for whoever established those rules.
2. Student makes the remark, "This is too difficult, I can't do it."	Student - student is expressing a feeling of frustration.
3. Student hits a classmate.	Student - student is generally expressing a feeling of anger. Hitting might also be used for attention or revenge.
4. Student repeatedly enters classroom late after the daily lesson has been introduced. Student is coming from a series of special music lessons.	Joint - student has a need to attend music lesson and teacher has a need to begin with the entire class.

Task **8.1** - Identify problem ownership.

Situation	Who owns the problem.
1. Student fails to turn in homework on time.	
2. Student refuses to work with small group to which he is assigned because, "They won't let me do any of the work."	



Task 8.2 - Presented below are examples of student problems and choices of teacher initial responses. Select the correct response.

Student's Remark	Possible Teacher Responses
1. I'm never going to work with her.	a. Why don't you forget it; he probably didn't mean it. or b. You seem to be really angry with him.
2. I can't do it!	a. Now, don't talk like that! Just get started! or b. It seems very difficult to you.
3. Billy ruined my project.	a. We had better speak to Billy about his behavior. or b. You're disappointed at losing your project and angry at Billy for destroying it.

Task 8.3 - Presented below are several student problems. Construct appropriate "active-listening responses."

Construct Responses

1. "Wow, my parents are really going to give it to me for flunking that test."

2. "How come we have to do all this work when the rest of the class gets to skip it?"

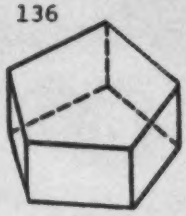
3. "I hate writing - it's for sissies."

4. "This class sure isn't like my regular class, the kids were a lot more friendly there."

5. "Mary always has to be the leader, I don't want to be in the same group with her anymore."

6. "John broke my project." (crying)

7. "Why do we always have to do this boring work, why can't we do some interesting things like the rest of the kids?"



3. Student fails to clean up after a messy art lesson.

4. Student comes in from playground and is overheard saying, "Boy, I'm going to get even with John for hitting me like that."

5. Student continually interrupts during class discussion.

6. Small group is disturbing surrounding students while practicing their skit.

7. Student says he can't work because his classmates are too noisy.

8. Student says, "I can't get started on this project."

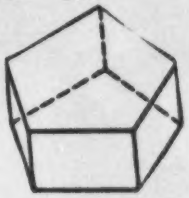
E_2 The teacher will be able to construct dialogues using "No Win - No Lose Conflict Resolutions," "Active Listening," and "I Message" statements as a result of studying definitions, explanations, and examples of teacher-student interchanges. (Application)

Active listening is the appropriate response to student owned problems. Gordon lists four levels of communication including:

1. Passive Listening
2. Acknowledgement Responses
3. Door Openers, Invitations to Talk
4. Active Listening (Feedback)

Active listening is the only level of communication that conveys to the student a sense of understanding. Active listening is designed to reflect feelings of teacher empathy and respect.

Active listening involves interaction with the student in a manner that provides the student with proof of teacher understanding. Teacher responses are designed to reflect the student's feelings and generally require that the teacher "make a guess" or "draw an inference" about the feeling of a student. Teacher feedback is initially used to validate understanding of student feelings -- teacher is guessing and initial responses are designed to determine if teacher has accurately defined the student's feelings. Responsibility for solving the problem is left up to the student. Teacher role is solely to help the student clarify his problem and to look at it realistically.



"I messages" are delivered when a problem interfering with learning belongs to the teacher.

An "I Message" consists of three specific parts including:

1) What is creating the problem?
2) Identifies the tangible or concrete effect on the teacher, and
3) Identifies feelings generated within the teacher.

Example - "When you have your feet in the aisle (description of behavior), I'm apt to trip over them (tangible effect) and I'm afraid I'll fall and get hurt (feeling)."

"When you come in late (1), I have to stop whatever I'm doing (2). It's distracting to me and I'm frustrated (3)."

"I messages" are presumably effective because they:

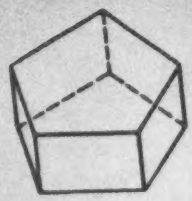
1) Indicate an acceptance of responsibility for an inner feeling by the teacher.
2) The teacher assumes responsibility for being open enough to share this inner feeling.
3) Responsibility for the student's behavior remains with the student, and
4) Negative impact is avoided.

"I messages" meet three important criteria for effective confrontation.

1) They have a high probability of promoting a willingness to change;
2) They contain minimal negative evaluation of the student; and
3) They do not injure the relationship.

Task 8.4 - Presented below are examples of teacher owned problems with alternative types of responses. Select the appropriate response.

Student Action	Possible Responses
1. Student fails to replace books on bookshelf.	a. When you don't keep agreements, I feel it's unfair because I have to do all the work. or b. John, will you please replace the books you have used?
2. Student interrupts during a small group lesson.	a. Mary, you are being very rude. Now please wait until I am free. or b. Mary, the group cannot hear me when you are interrupting and I am afraid they will miss the directions.



3. A small group of students is making considerable noise while working on a project.

a. Boys, if you can't work quietly together, then you will have to work alone.

or

b. Boys, your noise is disturbing the class and I'm concerned that other people cannot get their work done.

Task 8.5 - Presented below are teacher owned problems. Construct appropriate responses.

Responses

1. Student fails to complete an assignment on time.

2. John is doodling at his seat when he still has considerable work to finish.

3. Student speaks out during class discussion without being recognized.

4. Student runs to head of line when preparing to go to music.

5. A student is tearing up your newly designed learning center.

6. Student is having difficulty solving a problem.

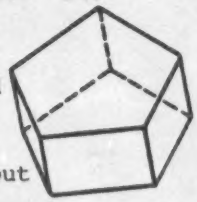
7. Students appear to be bored during a lesson that the teacher has spent considerable time preparing.

"No Win - No Lose Conflict Resolution" procedures are used when problem ownership is shared by both the student and the teacher.

Application of effective conflict resolution procedures requires a teacher skilled in active listening and a teacher who is open enough to deliver honest "I messages." Honesty, understanding and willingness to negotiate must be obvious and shared by both parties in order for the process to function. The process may be applied with both individuals and groups.

Briefly, the process requires that both (all) individuals involved in the resolution process participate in:

1. Defining the Problem - requires a critical assessment of both student and teacher needs and identifies precisely what the problem is.



2. Generating Possible Solutions - both teacher and student should list a set of possible solutions.

3. Evaluating Solutions - both teacher and student should strike out unsatisfactory solutions.

4. Making the Decision - a joint selection of one solution by consensus decision.

5. Determine How to Implement the Decision - write down conditions implementing the solution and defining all terms in the solution.

6. Assessing the Success of the Solution - May not require a formal evaluation but some analysis of solution effectiveness should be completed following a trial period. Perhaps the solution is worse than the problem - can't be afraid to change.

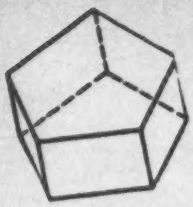
Task 8.6 Recall a conflict from your teaching experience, define the problem and list several "No Win - No Lose" type alternative solutions.

E_3 The teacher will be able to construct natural and logical consequences for classes of student behavior as a result of examining explanations and examples of natural and logical consequences. (Application)

Occasionally, there are times when students repeatedly exhibit disruptive and/or irresponsible behavior. Such repetitions cannot effectively be handled with the preceding suggestions and more drastic steps need to be taken. This next step temporarily restricts student freedom but is nevertheless part of a process designed to build social independence.

Student responsibility for behavior is developed through a process in which the student recognizes that he is accountable for his own personal behavior. Students are free to make decisions about how they behave but they must recognize that disruptive behavior carries with it, certain consequences. Standards for social and academic behavior should be developed early in class discussion with student solicited descriptions of desirable and undesirable behavior. Assurances should be given that everyone is free to behave in his own best interests but that because this is a group - a social setting - considerable attention must be given to needs of the total group. Behaviors that interfere with learning by other members of the group are not acceptable and will be accompanied by separation from the group. Separation is generally preceded by a warning and repeated offense sends the offender into isolation. Return from isolation can be at the students' or classes' discretion or can require that the student develop a plan for modifying his behavior. Continued disruption while in isolation may result in a conference with either a parent or a counselor.

The key to this process is a full and complete understanding of a freedom to do as "I want to," as long as the needs of the group are accommodated. Failure to respect group needs results in pre-arranged consequences that are administered quietly, calmly and consistently.



Academic irresponsibility is treated slightly differently. Failure to complete work within expected or reasonable time periods are simply met with new deadlines that may require missing optional activities, staying after school, or completion at home. Again, the key is a clearly defined expectation, reasonable time allowance and student freedom to make the choice.

Example

A 4th grade class has discussed academic and social responsibilities within the classroom and has arrived at two basic rules. First, any behavior that interferes with the rights of others to learn is disallowed and second, all assignments will be completed by previously agreed upon due dates. Social responsibility violators will be given two warnings per day and then sent into isolation. Removal from isolation may be made voluntarily when the student is ready - once. A second violation during the day requires a written plan of action on how repeated disruptive behavior is going to be modified. Continued disturbance while in isolation requires permission of the principal to return to the classroom.

Academic violators simply miss recess time until work is completed. If the student has made the choice to not work in school then repeated lateness will require a note from home describing why work cannot be completed during out of school hours.

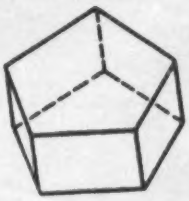
Examples - Presented below are examples of situations in the fourth grade classroom just described with teacher responses.

Student Action	Consequence
During conference time with individual students the following events occur.	
1. Mary sits day dreaming.	Nothing - Mary is free to choose when she completes her work.
2. John walks past a table and pushes Billy's book on the floor.	Warning - This is interfering with Billy's work.
3. Billy interrupts conferencing by requesting help.	I message - "Billy, I would like to help you but right now I'm working with Susan and your request is breaking my chain of thought."

Task 8.7 Again based on the described fourth grade classroom, provide appropriate teacher responses.

1. John (same one) throws a paper wad at Nancy.

2. Michael hits Craig as he works by his table.



3. Small group is talking so loudly, neighboring students complain that they can't concentrate on their work.

4. John (returned from isolation) sits sullenly at his desk doing nothing.

5. Betsy, with whom teacher is having conference has failed to complete her contract.

E_4 The teacher will be able to describe the use of "Magic Circles" as a result of reading about the use and application of "Magic Circles". (Comprehension)

The magic circle is a systematic procedure designed for several specific uses. Bessell and Palomares (1973) recommend the circle arrangement as the basis for a human development program while authors like Glasser and Gordon use a circle type arrangement for establishing group participation in group decision-making and group problem-solving. Bessell and Palomares recommend that the magic circle at grades K-4 be developed over time. They recommend starting with three groups and building up to the full class circle over a time period of from three to 24 weeks. Variations in development depend on class composition.

The magic circle arrangement provides for:

1. Focusing attention on a speaker.

2. Establishing eye contact between speakers and listeners.

3. Focusing attention on listening.

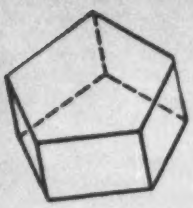
4. Securing contributions from everyone who wishes to contribute.

5. Establishing and practicing rules for speaking and listening.

6. Conducting a variety of class discussions including decision-making, problem-solving, exploring feelings, and introducing units.

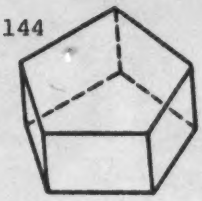
Procedures for operating within the circle are generally established with topics that provide opportunities for non-threatening and positive type responses. e.g. "I really feel good about _ _ _ _", where each child in turn has an opportunity to respond or pass. Confidence in responding and discussion is developed to the point where real problems can be solved, feelings can be shared, e.g. "How I felt when I did not get attention." and opinions expressed, e.g. "I did not like it when the teacher _ _ _ _."

Numerous specific activities for establishing and maintaining the magic circle are provided in the Bessell and Palomares material.



Task 8.8 Write in your own words, a brief description of magic circle.

Terminal Task - Briefly describe how you would plan to apply the concept of social independence in your unit of study. Give at least one specific example of how the concept can be associated with a specific activity within the unit.



Answer Key

Task 8.1

1. Teacher, teacher gave the assignment.
2. Student, student is expressing a feeling of "being left out".
3. Teacher, teacher made the assignment.
4. Student, student is expressing angry feelings.
5. Joint, student wants to express himself, teacher wants to conduct a discussion.
6. Joint, teacher wants it quiet so all groups can work, skit group needs to make noise.
7. Student, student needs quiet to work, joint problem with classmates who need to make noise.
8. Student, student expressing feeling of frustration.

Task 8.2

1. b
2. b
3. b

Task 8.4

1. a
2. b
3. b

Task 8.3

1. You are really afraid your parents will be angry with you.
2. You don't feel it's fair for different groups to do different types of work.
3. You feel uncomfortable with writing tasks.
4. You are feeling unhappy because you haven't made new friends yet.
5. You are upset because Mary is always chosen as the group leader.
6. You are really upset because of all the work you put into your project.
7. You are unhappy about the time it takes you to finish your work.

Task 8.5

1. I'm concerned that your not doing the homework on time will make it very difficult for me to judge your progress.
2. John, I'm worried about the amount of time I'll have to work with you later if you don't work now.
3. Mary, my train of thought gets broken when you try to talk to me and I'm talking with other students.
4. Billy, I'm always afraid someone will get hurt when you run in the classroom.
5. Max, that really makes me angry to see you tearing up something I have put so much work into.
6. Billy, I feel uncomfortable about the time I'm spending with you because you do not appear to be paying attention.
7. Boys, I'm upset because I have spent a lot of time on this lesson and you are not paying attention.

Task 8.6

Review steps in the No-Win, No-Lose conflict resolution procedure.

Task 8.7

1. Quietly - John, second warning
2. Quietly - Michael, first warning
3. Boys, I'm upset because your noise is disturbing other children.
4. Nothing - John is free to choose or "I message" (see Task 8.5 response 2)
5. See Task 8.5 response 1.

APPENDICES

Appendix A: Worksheets

Work Plan

Module 1 Unit Topic:

Rationale:

Module 2

Cognitive Behavior Level Verbs Which Indicate Them

1.

2.

3.

4.

5.

6.

Module 3

Concepts, Definitions and Multiple Discriminations

1.

2.

3.

4.

5.

6.

Module 4 Technique:

Concepts, Activities and Cognitive Behavior Level

1.

2.

3.

4.

5.

6.

Principles:

Problems:

Module 5

Terminal Objective(s)

Enabling Objecitves

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

Module 6

Introductory Activity

Culminating Activity

Module 7

Management System:

Description of tasks completed in conversion process:

Module 8 Social Independence Activities

Module 9 Academic Independence Activities

Sample of Completed Workplan

This is an abbreviated example intended only to illustrate each step.

Module 1: Unit Topic - Science Fiction

Rationale - A unit of study on science fiction for intermediate level, intellectually gifted students takes advantage of a high interest topic that combines fact and fantasy. Although predominately a literature unit, the study of science fiction can be broadened into almost any topic of interest including mathematics, social relationships, science, ecology, etc. Opportunities for research into the development of Science Fiction, its uniqueness, its proponents, and its definition provide substantial practice in comprehension, application and analytical behaviors. Projecting beyond what has already been written and role-playing present synthesis level challenges. Creativity in drawing, writing, building, playing and hypothesizing abound within the topic.

Science Fiction is a basic literature form that students and adults may enjoy as a leisure time reading activity. Exposure at this stage of development will provide a solid foundation for understanding the role of science fiction in our world and hopefully, increasing the frequency of choosing this form of literature.

Module 2: Cognitive Behavior Level	Verbs Which Indicate Them
1. Knowledge	define, recognize, recall, label, distinguish
2. Comprehension	describe, rephrase, paraphrase, illustrate, restate
3. Application	apply, use, relate, employ, generalize
4. Analysis	compare, contrast, analyze, deduce, categorize
5. Synthesis	create, produce, design, originate, formulate
6. Evaluation	judge, criticize, validate, justify, argue

Module 3: Concepts

1. Science - The observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena.
   Multiple discriminations: distinguish science from aesthetics, art, philosophy, ethics, magic, history.

2. Fiction - Something invented or imagined.
   Multiple discriminations: distinguish fiction from non-fiction.

3. Literary Genre - A distinctive class or category of literary composition.
   Multiple discriminations: distinguish class from randomly associated items in a group.

4. Future - The indefinite period of time yet to be.
   Multiple discriminations: distinguish future from past and present.

Principle

Science fiction is the literary genre distinguished by imaginary happenings set in the future but based on present scientific knowledge and using scientific explanations of hypothesized phenomena.

Problems

1. How can science fiction extend present scientific knowledge without contradicting it?
2. Where do science fiction writers get their ideas?
3. Rewrite a fairy tale as science fiction.
4. Compare science fiction and other types of fiction.
5. Rewrite a science fiction story as historical fiction.

Module 4: Activities using Williams' strategies - please see Module 4.

Module 5:

Terminal Objective: Sixth grade intellectually gifted students will be able to identify the trends in the present which science fiction writers have developed into the realities of the future as demonstrated by an analysis of a specific work using that criteria. (N)

Enabling Objectives

1. Students will define science fiction as a result of: (K)
   a. defining science, fiction, literary genre, and future.
   b. reading, listening to and viewing several science fiction articles.
2. Students will propose a hypothesis to explain why it is that science fiction writers are able to accurately predict new inventions but not create them as a result of recognizing and identifying specific examples in the literature. (S)

3. Students will analyze at least a dozen works classified as science fiction to determine their commonalities as a result of generating criteria for comparing/contrasting and reading the works. (N)
4. Students will write a science fiction story in which something unknown in another science fiction work is now known as a result of:
   a) defining unknown,
   b) identifying an unknown element in a story,
   c) generating hypotheses about when and how it could be known,
   d) applying writing skills. (S)
5. Students will predict the effect of a science fiction "fact" suddenly becoming real as a result of:
   a) identifying a science fiction "fact",
   b) relating the "fact" to the present. (S)
6. Students will evaluate a science fiction work in terms of how it contradicts our habitual ways of viewing things as a result of:
   a) identifying science fiction concepts in a work,
   b) identifying present-day use of those concepts,
   c) relating a and b. (E)
7. Students will rewrite a science fiction story, changing the sex of the main character as a result of:
   a) identifying the main character in a story,
   b) identifying the implications for the story of substituting an opposite-sexed main character,
   c) applying knowledge of story writing. (S)
8. Students will rewrite a science fiction story including themselves as a character as a result of:
   a) identifying a story,
   b) creating a character,
   c) analyzing the implications for the story of this new character. (S)
9. Students will propose a hypothesis about the relationship of a science fiction writer and a scientific background as a result of:
   a) examining the biographies of several writers,
   b) drawing conclusions about individual authors,
   c) making a generalization. (S)
10. Students will compare two science fiction works written 100 years apart as a result of:
    a) identifying two works written 100 years apart,
    b) reading the words,
    c) identifying criteria for comparison. (N)
11. Students will create sound effects or illustrations for a science fiction work as a result of:
    a) identifying concepts for illustration,
    b) applying aesthetic skills. (S)
12. Students will investigate the effect of science fiction on the scientific community as a result of:
    a) identifying leading areas of research in science,
    b) identifying links between science fiction and science,
    c) researching the life and works of scientists who "invented" science fiction "facts". (N)

Module 6

Introductory Activity: Where do ideas for science fiction come from?

1. Students will brainstorm answers to the question.
2. Students will analyze the question for clarity as a statement of the problem.
3. Students will generate a list of topics to investigate and research to use in answering the question.

Culminating Activity (See Module 6)

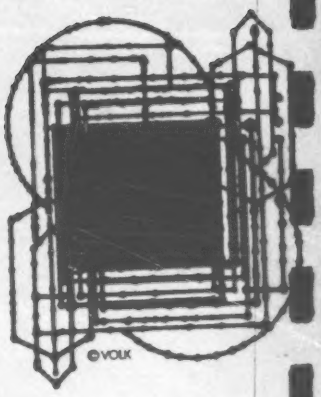
1. Students will propose hypotheses to answer the introductory question.
2. Students will support hypotheses with evidence.
3. Students will choose an audience to present their products to.
4. Students will analyze the audience they have chosen for the purpose of planning activities for them.
5. Students will formulate and practice a presentation based on their hypotheses.

Module 7

Management System: Theming, Contract, Independent Study
Description: Topics of investigation by students will be generated in the introductory activity. The theme map will be posted in the learning area. Each student will have a contract. They will be required to complete enabling objective 1, four other enabling objectives, and an independent study on the topic of their choice.

Module 8

1. Students will identify problem ownership and suggest solutions in the conflict between Harrison Bergeron & Diana Moonclamper in the story by Kurt Vonnegut as a result of defining problem ownership and conflict and reading the story. (A)
2. Students will identify the logical consequences of Harrison's behavior and identify the same for their own behavior as a result of a class discussion. (N)
3. Students will participate in a Magic Circle using the stem; "If I were Harrison I would have..." as a result of understanding the rules of Magic Circle and thinking about their own reactions to the situation. (K)



Unit Plan (final form)

Topic:

Author:

Population:

Management System: (from Module 1)

Rationale:

I. Introductory Activity (fome Module 6)

II. Terminal Objective(s) (from Module 5)

III. Enabling Objectives (from Module 5)

IV. Culminating Activity (from Module 6)

V. Communication Activities (from Module 8)

VI. Bibliography: (List any particularly helpful sources, and the textbook you used if any. Avoid copying bibliographic information from the card catalog.)

Appendix C: Bibliography Format

1. Periodicals

Harlow, H.F. Fundamental principles for preparing psychology journal articles. Journal of Comparative and Physiological Psychology, 1962, 55, 893-896.

2. Books

Strunk, W., Jr., & White, E.B. The elements of style (2nd. ed.). New York: Macmillan, 1972.

3. Film

Wolff, L. (Producer). Rock-a-bye baby. New York: Time-Life Films, 1971. (Film)